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by Christopher Anvil



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Vol. 38, No. 1

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EDITORIAL

PRESUMABLY you have already noticed our newly redesigned logotype, and wondered whether this presaged more changes in the interior of the magazine, or Heaven knows what! From time to time during this New Year there will be some small changes in an effort to visually improve the magazine. Also, you will find a new regular contributor starting in the March issue. See February's Coming Next Month for further details. In the meantime, we trust you will agree with us in thinking that our new logo is more distinctive and attractive than our old one. We also think that what is inside the magazine is more important than the logo, anyway.

* * *

For those of you interested in the "impossible" idea—scientific, philosophical, or what have you—let us commend a book quietly published by Basic Books some months back: *The Scientist Speculates—An Anthology of Partly Baked Ideas*. Its editor, philosopher-mathematician I. J. Good, defines a partly baked idea as "a speculation, a question of

some novelty, a stimulating analogy. It has a bakedness that is less than unity, or even negative. The bakedness of an idea should be judged by its potential value, the chance that it can be completely baked. . . . It is often better to be stimulating and wrong than boring and right."

As an example of a *pbi*, Dr. Good puts forth a theory he admits he does not believe in—and which cannot, if it is true, *be* believed in! The theory is that we are on earth as punishment for crimes we each committed in heaven. "We each have to run through a deterministic punishment," observes Dr. Good, "according to the magnitude of our heavenly offense. Even if we are happy here, it is a poor sort of happiness in comparison with what we shall have when we return. But part of the punishment is that we cannot believe the theory. For if we did, the punishment would not be effective."

* * *

Addendum to our recent note re the explosion of Burroughs books, movies, etc. (And note our
(Continued on page 122)

SPEED-UP!



By CHRISTOPHER ANVIL

Illustrated by ADKINS



What's the definition of an experiment? A test whose pre-ordained result is known? A chance-taking? Or just plain homicide on a planetary scale?

DAVE Martinson eased shut the door of the magnetics lab, and stood still, listening.

In the shadowy silence, with the engineers and technicians gone home, the lab was an unearthly place. Its concrete floor stretched dimly out to the distant walls, making Dave feel like a fly standing on the corner of a table. Overhead, thick loops of heavy black cable branched and rejoined, like the web of a spider woven between the looming bulks of silent equipment.

In the daytime, with the lab blazing with light, and with the cheerful greetings of friends, Dave hardly noticed the strangeness. It was no worse, certainly, than his own lab, where he worked as a cryogenics engineer. But it wasn't just the silence, the darkness, or the strangeness of the lab at night that bothered him.

What really bothered Dave was that, despite the air of emptiness and silence, he knew he was *not* alone.

Somewhere in the dimness, there was someone else.

And, remembering his conver-

sation several days ago with Sam Bardeen, Dave knew the reason—Sabotage. What Bardeen had said had made that clear.

Bardeen, president of the research corporation, was a mysterious figure. Unknown ten years ago, he and his advisor, Richard Barrow, had risen till they headed one of the biggest and most successful, private research outfits in the country. Bardeen made it a point to meet everyone who worked for him, and several days ago, he'd sent for Dave. He shook hands with a firm grip, then motioned Dave to a chair. They talked about the research center, and Bardeen asked, "How much do you know about Project 'S'?"

Project "S" involved the most secret work in the research center, and Dave wasn't supposed to know a thing about it.

He said, "I know it's secret. I know a great amount of material has been brought in there, but I have no idea what it was. Naturally, I've wondered about Project 'S'. I suppose we all have. I've heard it said, on good authority, that it's a new process

for the purification of sea-water. All I'm really sure of is that it's *not* for the purification of sea-water."

"Why do you say that?"

"To begin with, the security precautions are too tight. We already have a lighted, well-guarded fence completely around the whole research center, which itself is far out of town, isolated, and set well back from the road. But in addition, there's the so-called 'inner security compound,' with its own gate, guardhouse, and lighted fence, around the Project 'S' building, the cryogenics and magnetics labs. The people in those labs can't go into the Project 'S' building, but Project 'S' people can go into the labs. Everyone who works on Project 'S' lives here with his family, goes to the doctor kept here especially for him, goes to the dentist here, and goes to the movies here. He does his work in the *inner* compound, yet it's necessary to go through four gates and past three guardposts merely to get into the *outer* compound."

Bardeen laughed, but said nothing.

DAVE said, "With due respect to the people who say they're purifying sea-water in there, I just don't believe it."

"Well," said Bardeen, "you have to remember, there's a se-

vere water shortage developing in this country. Whoever can develop a fast, cheap process for purifying sea water can expect to make a sizeable profit. Naturally, we'd want to keep our process secret."

"If there were need for *that* much secrecy, the words 'sea-water' would never be mentioned around here. As it is, it's the quasi-official explanation. But I've hardly begun to mention what's wrong with it. For instance, there's the fact that the cryogenics and magnetics labs obviously tie in with Project 'S,' since they too are in the inner security compound. And in the cryogenics lab, we've been doing a great deal of work close to absolute zero. Now, on the everyday Fahrenheit temperature scale, that's around four hundred and ninety degrees below the freezing point of water. At these temperatures, sea-water would long since have been frozen into one solid chunk."

"New processes—" said Bardeen.

Dave nodded. "Granted. But there are other things wrong with the sea-water idea. For instance, the superconductivity work that's been done? Where does that fit in? And the magnetics lab's work to produce powerful magnetic fields of large cross-sections? And the fact that the cryogenics lab is turning out

volumes of low-temperature liquids and slushes, which are piped next door to the magnetics lab and run through huge units called 'Blocks,' which obviously are a part of Project 'S'?"

"How do you know?"

"The magnetics lab uses cryogenics products and equipment, and naturally they need our help from time to time. It's impossible to work on that equipment without noticing things. For instance, that the Blocks in the magnetics lab are shaped as parts of some larger structure. But there's no provision to join them or even get them out of the lab, so it follows that they're full-scale models, with the unified, finished device—which would be very large—somewhere else. The Project 'S' building is huge, and it's right next door. The connection is obvious."

Bardeen looked at Dave wonderingly. "I had no idea our cover was as thin as that."

"It might not be to an outsider."

Bardeen thoughtfully massaged his chin.

"What is Project 'S'?"

"In my opinion, it's a thermonuclear reactor."

Bardeen glanced out the window. His hands lay calmly on the desk, but for an instant he was biting his lip. Then he shrugged, and he turned to face Dave frankly.

"You're close enough. I can't tell you just *how* close, but it's enough to explain the security precautions we're taking. I'm concerned about the security aspect myself, and my partner, Mr. Barrow, thinks there may be trouble with saboteurs or industrial spies." Bardeen looked at Dave as if making some point, then he smiled and said, "Now, I wonder if you'd tell me about your work. I understand you've developed a highly effective new cryostat. How did you lick the problem of conduction losses?"

And the rest of the conversation had been technical. But the idea had been firmly planted in Dave's mind that what was going on in the Project 'S' building was something that might readily attract industrial spies, eager to seek out the secrets of a competitor—and it might even attract saboteurs.

It was this thought that had made Dave glance more sharply at the dimly-seen movement near the magnetics lab tonight, when ordinarily he was not at all security-minded. That he should see anything was sheer chance. The three buildings in the inner security compound happened to lie in a straight line from north to south. The cryogenics lab, where Dave worked, was farthest north, connected by an enclosed walkway with the magnetics lab in the middle, which was connected

by another enclosed walk to the overshadowing bulk of the Project 'S' building. The labs had their own individual parking lots, separated only by a swath of green grass, and it had been from the northernmost parking lot that Dave, just driving out after working late in the cryogenics lab, had seen the intruder.

THE sun by then had gone down, and the deep shadow of the magnetics lab was thrown across its empty parking lot. It was the time of evening when it wasn't daylight, and it wasn't yet dark. It was impossible to see clearly, but it was still light enough so that headlights were not much help, either. When Dave saw the blur of motion, he thought at first it was a trick of the eye. But remembering Bardeen's comment, he slowed his car to a stop, and rolled down the window to watch.

From the front of the magnetics lab, about where the door should be, came a large dull flash of light, seen for a moment, then gone.

Dave glanced around. At the end of the drive, several hundred feet in front of him, was a small guardhouse by the gate in the fence of the inner security compound. Tall lightpoles lit the cars that stopped near the gate, and lit the fence that stretched due north along the edge of the com-

pound. The guardhouse itself was dazzlingly bathed in light. One quick glance was enough to show Dave what must have happened.

The door of the magnetics lab was highly polished. The lab, Dave's car, and the guardhouse were on about the same level, with the lab set off to one side. If the door were opened at a slight angle, its polished surface would reflect the brilliant light from the guardhouse. If the door were swinging shut, it would reflect it only briefly.

The question was—Had the door opened when someone came out?—Or had someone gone in?

Dave frowned briefly, puzzled that the built-in photoelectric switch hadn't yet turned on the lights in front of the lab. Then he snapped on his headlights, and swung the car so that their lights rapidly swept the front of the lab from one end to the other. There, at least, it was dark enough so that the headlights helped, and he could see that there was nothing there but the wide cement walk in front of the lab, the flat outjutting roof, and the empty asphalt of the vacant parking lot.

No-one had come out.—Therefore someone had gone *in*.

Dave cast a quick glance at the guardhouse down the drive, set the parking brake, got out and locked the car door.

The prudent thing, he knew, was to go down to the guardhouse and tell what he had seen. But the guards, from their position, would have seen nothing. To explain his reasoning would take five minutes at least, and one of the guards might think Dave hadn't seen what he *had* seen. There usually were only two men on duty in the guardhouse, and they might well have to call up and get permission before either of them could leave. The possibilities of delay stretched out, and Dave decided not to do what he was supposed to do, but instead to do something that ought to bring action in a hurry. Leaving the car with its lights shining on the door of the lab, he turned directly into his headlight beams, ran to the door, and gripped the knob to try it. He found to his surprise that while the door was *locked*—so that he couldn't turn the knob—it wasn't *latched*. The catch had not snapped into its slot. As he tugged at it, the door pulled open.

Dave looked quickly around, and saw someone standing in front of the guardhouse, looking his way. He yanked the door wide open, and went inside.

He was immediately rewarded by the blare of a siren.

Once, twice, three, four times it sounded, in short blasts, signaling the need for immediate

help at guardhouse number four.

Guardhouse number four was right there at the end of the drive, and the need must seem urgent to them to use the siren. That would bring the reinforcements on the run.

DAVE let the heavy door swing almost shut, cutting the siren down to a distant wail. He made sure the door didn't latch, and looked around in the dim light at the closed doors of several offices, the two washrooms, and the lab itself. There was no sound of movement anywhere, and he paused to swiftly think thing over. The car lights were directly on the front door, and the two men at the guardhouse would be watching it closely. In perhaps five minutes, the guards from the security building would be here, and any intruder in the offices would be trapped. But from the lab, the two covered walkways led to the cryogenics and Project 'S' buildings. And in the lab itself, a saboteur could make a nightmarish mess. Dave cautiously eased open the lab door, and slid inside.

—And found himself listening, in the shadowy silence, with the concrete floor stretching dimly out to the distant walls, and the thick loops of cable like a web joining the looming bulks of equipment.

Then he heard the faint scrape

from across the lab to his left.

In the gloom, hoping his eyes would accommodate to the dimness, Dave moved forward. His blood pounded in his ears, and he could hear the sound of his own breathing. The guards by now should be pouring out of the security building into their Jeeps. They would be here in three or four minutes. Their first move on arrival would naturally be to snap on the lights of the lab. It wasn't smart, but it was their only chance to end things fast. The trouble was, whoever was in here would be well-armed. In the exchange of gunfire, a bullet might plow through a surface designed to resist changes of temperature, not impact. One of the pipes might be cut, sending out a spray that would crystallize air in an instant. Worse yet, the liquified gas in a big damaged cryostat might vaporize, building up enough pressure to burst the cryostat and release a blast of liquid and vapor that would freeze a man solid on contact.

Dave abruptly found himself up against a large, gently-corrugated, curving surface. He reached out cautiously across it, and realized it was one of the branching coolant lines leading to the magnetic Block that loomed up over his right shoulder. The gently corrugated surface was a thin sheet of aluminum over the underlying insula-

tion. If he tried to climb over it, it might buckle, with a noise that could bring a fusillade of bullets in his direction. He reached down, and found the space beneath it too narrow to crawl under. He worked to his left, and found another magnetic Block in his way—he looked around. The lab, instead of appearing lighter as his eyes grew accustomed to the darkness, appeared darker yet as the feeble daylight coming in the few high windows faded out.

Somewhere, there was the sound of a key sliding in a lock, the faint rattle of a door, then silence.

Dave made his way around the block to his left. He could picture the intruder going down the enclosed passage to the Project 'S' building. But if Dave could reach the door before it shut—

Not four feet in front of him, there was an explosive sigh of disgust, then a soft metallic sliding sound.

The door hadn't opened after all.

But Dave was close now, and moving too fast to stop.

His left foot hit a heavy solid bulk on the floor, throwing him forward off-balance.

From a darker shadow beside him, there was a quick insucking of breath. Then the back of Dave's skull seemed to explode. He was on one knee, helpless,

when a heavy thud and an agonized curse told him the intruder had tried to finish him, and had hit too high.

Across the room, there was a low voice.

Abruptly, there was blinding blaze of light.

"Don't move!"

Exactly what Dave had wanted to avoid had now happened.

And he was nicely placed to collect the bullets.

For an instant, Dave felt the edge of a shoe press against his hand as his opponent pivoted. There was the slide-snap of an automatic made ready to fire. Dave grabbed the ankle above the foot, jerked it up, wrenched the foot.

There was a deafening roar. Bits of cement spattered across his face. The room echoed to a volley of shots. He tipped forward off-balance. There was a crash, another roar, the memory of a high whining noise, and hot wind across his forehead. His left hand slid in a slippery hotness, and then there was the sound of running feet.

IN half an hour, it was all over. Dave had shown passes and permits, identified himself to the guards' satisfaction as Dave Martinson, cryogenics engineer, and then they'd called up the administration building, where Sam Bardeen had left for home,

but Richard Barrow was still on hand. Barrow examined the collection of burglar's tools, the small flat camera, and the little small black tubes imbedded in them. Barrow looked at Dave quizzically, then glanced questioningly at the doctor, who was bent over the motionless form lying in a pool of blood. The doctor shook his head.

Dave and Barrow exchanged a few more words, then Dave went to wash up. As Dave left the room, Barrow called, "Watch your driving. There are a lot of fools on the road."

Now that Dave was at the wheel, Barrow's comment bothered him. It was the kind of thing anyone might say, but Barrow wasn't anyone. Barrow, like Bardeen, was unpredictable, and not given to platitudes.

Irritated, Dave thrust the thought out of his mind. He fingered the bump at the back of his skull. It was large, and it was tender, but at least he was all right. He still had a date tonight.

That thought put Barrow's warning out of his head.

He slowed to show his pass at the outer gate, and a few minutes later he was on the road to town, thinking of Anita Reynolds, who was a lovely girl with a sweet personality, a beautiful figure, and only one flaw.

He was thinking of her when,

for no reason that he knew, he felt a sense of unease that caused him to lightly press the brake pedal.

Forty feet ahead, a truck loaded with crates of chickens roared out of a side road without stopping, swung halfway across the road to straddle the white line, and then slowed down.

Dave slammed on the brakes. His car slowed so fast the steering wheel dug into his ribs. The rear end of the truck enlarged, the swaying crates rose high above him, and his radiator tried to ram itself in under the rear of the truck.

Dave pressed with all his strength on the brake pedal.

There was a grind of gears up ahead, and Dave found himself stopped dead, the truck swaying down the road in front of him with both left wheels over the white line.

His memory awoke in a rush. "Watch your driving," Barrow had said. "There are a lot of fools on the road."

Dave swore involuntarily, and stepped on the gas.

Ahead of him, the truck accelerated to exactly thirty miles an hour, and weaved back and forth across the road, staying far to the right on sharp curves, the tops of hills, or when oncoming cars were near, and moving back across the middle when there was a clear straight stretch ahead.

No matter what Dave tried, he couldn't pass. Then from behind came a scream of brakes as some fool, doing ninety down the narrow road, abruptly closed up on Dave, who was held to thirty by the truck ahead. The lights of the car behind rapidly grew dazzling, Dave pulled as close to the truck and as far to the right as he dared. The car swung past on Dave's left, and the driver was promptly rewarded with a rear view of the truck. By some miracle, truck and car remained unhurt, and Dave found himself third in line.

In Dave's memory, Barrow's voice repeated, "Watch your driving. There are a lot of fools on the road."

It was a slow trip back to town. But, with the back of his neck still tingling, Dave made it at last.

ANITA Reynolds had a clear, bell-like laugh. Her shining brown eyes lit up as Dave told the story. The laugh made the other diners turn, and the sight of Anita's smile, her face glowing as if lit from within, made them smile with her.

"What did you do?" she asked.

"What could I do?" said Dave. "I slowed down till I had a hundred feet between me and them, then I spent the rest of the trip glancing back and forth from them to the rear-view mirror.

The truck slowed down to show who was boss, and we averaged twenty-five miles an hour all the way in."

The waiter discreetly laid the check face-down on the table, and Dave stood up to help Anita with her coat. He left a generous tip for the waiter, paid the cashier, and they started out. Anita glanced at Dave and smiled. "Dinner was very good. Thank you."

Dave grinned. "They have good food here. The place seems generally stuffy and behind the times, but the food is unbeatable."

Anita laughed. "What do you want, dancing girls?"

"Of course."

She was smiling at him, and Dave, smiling back, was aware of her warmth, her quick response to him, and her beauty. If only, it could always be like this. He pushed open one of the double glass doors to the corridor that led out to the street, and held the door for her.

She smiled her thanks, turning slightly toward him as she walked by. She had a beautiful figure, and for one instant Dave was dizzyingly conscious of it. In that moment, he knew that everything about this girl was right.

Her voice seemed to reach him only faintly, and it took a moment to understand her words.

"Good heavens," she was saying, her voice crisp, "look at those headlines!"

The sense of bliss was gone. Dave looked around wearily, wondering what it was this time.

Nearby in the hall was a stand displaying candy, cigars, magazines and newspapers. Anita was looking at a newspaper, whose oversize headlines screamed:

PILLS KILL AGAIN!

Dave looked at her wearily. Her shining auburn hair showed glints of flame in the light, and her face and figure were beautiful. But her brows were drawn, her lips compressed, and her eyes shot sparks.

"Look at this," she said, showing Dave the paper.

Dave looked at it dully, remembering that when he'd first met Anita, he'd told his best friend of his good fortune.

"I've found a wonderful girl," he'd said.

"Good for you."

"The only trouble is, she's a follower of this—Harkman Bates, I think his name is."

"Oh, God!"

"She belongs to the—what do you call it—the—"

"Security League," said his friend promptly. "Okay. You're not engaged to her?"

"No," said Dave, startled.

"You're not married to her?"

"Of course not."

"Drop her."

"Listen—", Dave protested.

"*You* listen to *me*! Every time you think of her, hold your breath till you're dizzy, and don't breathe till you think of something else. Go join the YMCA, and work out on the dumbbells and parallel bars till you're so worn out girls are meaningless. Sink yourself in abstruse mathematics till you warp yourself around into a frame of reference where sex isn't even conceivable. Go—"

"Listen," said Dave furiously, "I didn't say I was a victim of passion! All I said—"

"Was that you're falling in love with this girl, and she belongs to the Security League?"

"I just said she was a wonderful girl. Pretty. Intelligent. Good sense of humor. Nice figure. She's got everything. Only—"

"Yeah," said his friend cynically. "Well, that's all it takes. The uncontrollable passion will come later. Whether it will be love or murder I don't know."

"What do you mean?"

YOU'RE up against something you can't lick, that's all. You can't win. You're an engineer. The motto of the Security League might as well be, 'End Science Before Science Ends Us.' And it's backed up by facts, figures, sentiment, and some kind of mystical claptrap a man can't come to grips with. Right in the focus of

all this stands Harkman Bates. He's handsome, he's rich, he's got stage presence, he's got a voice of silver, and he's got an organization that works for him from morning till night. You might as well argue with an earth-moving machine.

"If you go with this girl, there'll be endless conflict, because you're an engineer, and you'll represent Science to her. Your ego is going to take the bruising of a lifetime. You're going to cease to exist any time League business comes up. When Bates comes on TV, you're going to find yourself converted into a piece of furniture. Afterward you'll have to listen to how wonderful and how right he is. Get out now. Cut your losses. It's a hopeless cause."

Dave stared at him. "How can you be so sure?"

"I've been through it myself. A different girl, but the same situation. Take my word for it. You might just as well fall in love with a land mine."

And now, Anita was studying the newspaper, her face angry and indignant.

She glanced at him reproachfully. "Your scientist friends are responsible for this. Over three thousand people have died or are in the hospital thanks to those pills, and yet we can go into that drugstore over there—" She pointed across the hall to the en-

trance of a drugstore—"And buy a bottle right now to cure a head ache. It doesn't say on the bottle that if you take too many they'll poison your liver. But—"

Dave remembered the last time he'd tried to argue with her. That had been over a magazine article to the effect that auto exhaust was connected with lung cancer and a lung condition called emphysema.

That argument had lasted three minutes by the clock, but it was three minutes packed with emotion and insult, and Dave wound up in the street, stunned.

This memory, too, passed through Dave's mind as Anita looked at him accusingly.

Then in memory Dave saw the smile on her lips and the glow in her eyes that had been there just a few minutes ago.

And Dave realized that he was *not* going to cut his losses. Somehow, there must be a way to *win*.

He'd already tried arguing it out with her, head-on. That had not worked.

He forced himself to look at the paper as if interested.

"I have to admit, you've got a point."

She frowned at him. "I expected a lecture on the virtues of science."

"Why? You're right."

This seemed to leave her totally confused. She started to speak, looked at him for a long

moment, then turned away, blushing.

He didn't understand this. But it was better than fighting.

They walked outside.

She drew a deep breath. "What a lovely evening."

"Isn't it?" said Dave. The air was cool and clear, with a fresh breeze. The streets were almost empty. Sometimes there was a solid mass of cars, the combined exhausts of which, as they started up at a green light, was enough to give anyone momentary doubts about technology.

She put her hand in his.

"I'm sorry I snapped, Dave."

"I know how you feel."

"I'm so glad you do." She smiled at him warmly. "Have you ever thought of joining the League?"

"Ah—"

They turned the corner. The theater marquee spelled out in bright lights:

BOB HOPE

Dave said hastily, "We're late. We'll have to hurry."

Where the Security League wasn't involved, Anita's sense of humor was cheerful and robust. And if there was one entertainer she liked above all others, this was the one. Fortunately, she forgot her question.

TWO hours later, their disagreement completely forgotten, they came up the aisle of the

theater hand-in-hand, and she smiled at him with sparkling eyes. They were buffeted by the crowd, but she didn't seem to mind. When they reached the lobby, she stopped for a box of popcorn. Around them people were rushing outside, and Dave felt a vague anxiety but couldn't pin it down. On the way out, they passed the door of a soda fountain known locally for its ice-cream, and its after-movie smacks.

Dave glanced at it. Something told him he should take her in there. He looked at her.

"Would you like—"

She smiled contentedly. "The air's so fresh, and it's such a nice evening. Why don't we just take a walk?"

At the same time, he knew this wasn't going to work out, and he could think of no reason why it shouldn't.

From somewhere came the rumble of a big truck, and on a building across the street the lights of cars were swinging across as the parking lot near the theater emptied itself.

Dave looked into her clear dark eyes.

He held her hand tightly.

At the corner, the traffic light turned green.

A big diesel truck gave a loud Baarroom! It started forward, slowed with a clash of gears, accelerated hard.

A host of cars rushed forward as their drivers, anxious to get home so they'd be wide-awake at work the next day, jammed down the gas pedals.

The traffic shot past down the street.

The wind was right in the face of Dave and Anita.

Gas fumes and diesel smoke whirled around them.

"Oh, *Dave!*" cried Anita angrily.

Once again she was a member of the Security League.

SHE was somber as he drove toward her apartment.

He turned the car radio on hoping to get music. Instead he got a smooth commercial voice saying:

"... boon for allergy sufferers, and it has been scientifically tested and found perfectly harmless, so you can take it without your doctor's prescription."

"Yes," said Anita acidly. "That's what you say *now*."

"And next," said the voice, "the news."

Dave reached out to change stations, but she said, "Let's listen."

"The town of Little Falls, Kansas," said the announcer, "was wiped out this afternoon Not by fire, not by flood, but by a man-made catastrophe. Little Falls is in farming country, and planes were spraying insecticide

unaware that the spray was remaining suspended in the air, to be blown in a thick deadly smog straight through town. Scientists say that the combination of atmospheric pressure, humidity, and temperature gradient which caused this smog was so unusual that no change in spraying technique is needed. The smog was only a freak, they say. But tonight, Little Falls is a ghost town—"

Anita huddled near the door, and the announcer droned on about detection of cheating on test bans, radioactive fall-out, the kidnapping of a rocket scientist from a Middle East missile project, an investigation of an additive used in baked goods, a case of the Black Plague carried halfway around the world in an airplane—and all though this recitation Anita shrank further from Dave. To wind it up, the announcer reported an experiment to:

"... determine, this coming Saturday, the internal structure of the earth, by explosion of nuclear missiles, fired down long shafts with powerful laser 'headlights' intended to melt the layers of rock in front of them when, at high speeds, they reach the ends of the shafts. These missiles are designed to penetrate further and explode deeper than any other man-made device in history. The object is to set up

seismic waves that can be analyzed by new equipment . . ."

Dave slowed to a stop in front of Anita's apartment house.

The news went on.

"... despite the qualms of we uninformed laymen, scientists assure us there is no danger because the explosions are small, geologically speaking. —And that's the news. Good night."

Dave shut the radio off before it could do more damage.

Anita said, in a small voice, "You didn't answer my question, Dave?"

"When?"

"Before we went into the movie?"

Dave remembered the question: "Have you ever thought of joining the League?"

He sighed.

"To be truthful, Anita I *hadn't* thought about it."

"Tonight is the first time I've even been able to talk to you about the League. Harkman Bates is going to speak on television in five minutes or so. Would you like to come up?"

"Sure," said Dave wearily, "I'll come up."

BATES' smooth deep voice rolled on. His chiseled features, cleft chin, and wavy silver hair gave him a look of distinction and power. His eyes spoke an unmistakable message of sincerity.

Anita, watching him, sighed.

Dave, contrasting the sincerity with the man's basic message, swore under his breath. Although it was unmistakable that Bates had a point.

"... deformed children," Bates was saying, "brought into the world because scientists *did not know* the true nature of the 'harmless drug' gave another warning. But still they do not see the nature of the very thing they work with."

His eyes blazed.

"Science is unpredictable.

"Will scientists never learn that?

"The result of any new and basic experiment *is not knowable in advance*.

"As science reaches closer and closer to the heart of nature, the results of miscalculation and ignorance loom larger. Already, the womb of woman has been distorted by science, the lungs of man filled with corruption by the technology of science, the natural longings of humanity perverted by this new godless religion.

"Steadily the world becomes more strange to us, made strange by science. Already there are those who cannot make their way in such a world, and the number grows, day-by-day.

"The scientists tells us, we must study, and learn, and take up the things of science. We

must all become scientists and technicians, and then we shall all be happy, well-adjusted.

"And all the time he says this, he is blinded to the flaw of his own belief:

"The results of an experiment *cannot be foreseen*.

"No-one knows where Science will lead us, or how suddenly the trail may end. Foolish men are raising this new unpredictable force to the point where we can no longer control it.

"*Now is the time to control it*.

"Now is the time to say—*So far and no further!*"

From somewhere, there rose an immense cheer, a thundering applause that grew and grew, and the camera shifted to show a huge audience on its feet, waving and cheering.

For just an instant, Dave remembered the blast of gas fumes on the street, the bitter expressions of boys on street corners, ready for trouble because they could find no work—machines had the jobs. He remembered the pills that were known to be harmless, and that did their damage anyway. He remembered his amazement at the list of ingredients in a package of baked goods. What were these things, anyway? He remembered the poisoned insecticide that had wiped out a town, thought of the tons of poison that were dumped on plants yearly, washed into the

soil and—then what? Did the plants take up the insecticide and pass it on, little by little, to the man who ate the plant?

These and many other things flashed through his mind.

"My friends," said the voice of the handsome silver-haired man,

"Now is the time to stop it!

"And to stop it forever!"

The cheer rose again, but Dave was out of the spell.

The speech was over.

A band was playing, and Anita, her eyes shining, turned to Dave, including him in her own world.

"Now you've heard him! *Now* will you join?"

Wearily, Dave shook his head. "For just a minute, I almost agreed. But it's no use, Anita."

She came over to sit beside him.

"Why not, Dave?"

Because he doesn't know what he's talking about."

He might have slapped her face. "Every word he said was *true!*"

"I know. But he didn't say enough words. He overlooked a little point."

She drew away from him.

"What do you mean?"

"*How* do you stop science? *How*, Anita? And what happens if you do? Science and technology give power, and the world is split up into countries that *want* power. If one stops, another will

go on, and get the power to overcome the country that stops. So no one *can* stop. But that's only part of it. We—"

"Dave," she said coldly, "don't you suppose he's thought of all this? The League isn't made up of fools."

"Then what's his answer?"

"I don't know. I'm sure he has one."

"I'm satisfied there *isn't* any. We're—"

"Then you'd better go."

Dave stood up angrily. "You don't want to listen, do you?"

She held the door open.

He walked past her. "Thanks. I listened to *your* side." He turned on his heel.

Her voice was cold as ice. "Thank you for a pleasant evening."

As Dave sat in his chilly car and pressed the starter, he could hear again his friend's voice:

"You can't win . . . It's a hopeless cause . . . You might just as well fall in love with a land mine."

Wearily, Dave drove back to his apartment, and spent the night in a miserable search for sleep.

THE next day, at the lab, his friend took one look, nodded wisely, and said nothing.

Around ten o'clock, word came that Bardeen wanted to see him. Barrow was in the office when

Dave got there, and listened as Dave told about the intruder in the magnetics lab.

Bardeen nodded finally. "We expected it. It's too bad, but that's life."

Dave said, "Do we have any idea how he got in?"

"Under the outer and inner fences, over the walkway between the magnetics lab and Project 'S', then around to the front and through the door. He had the key, and someone had changed the filter on the control that snaps on the lights around the roof of the magnetics lab. He obviously had an accomplice, but we have no idea who."

"The intruder wasn't one of our own people?"

"No. The police have identified him. The only interesting point so far is that he was a member of the Security League."

Dave blinked.

Barrow said, "They're naturally interested in anything that tends to discredit science. A disaster in any advanced research center would back up their argument that science is unpredictable."

"Would Bates stoop to that?"

"In that outfit," said Bardeen, "the right hand doesn't know what the left is doing, and the head is ignorant of both. Do you know much about the League?"

"I know a girl," said Dave, "who has every quality a woman

should have. But she's also a member of the League. I can tell you, that can ruin a date."

Bardeen smiled. "She doesn't question you about your work?"

"Never. It's a part of science, and she doesn't like science."

Barrow said, "What do you think of Bates' argument?"

"He's right that the ultimate results of an experiment are unpredictable. We don't really know whether, in the long run, science will turn out to have been good or bad. But that's beside the point."

"How so?"

"We're committed. We're in the position of a man who's decided to jump a chasm, has gone back for a start, and now, running full speed, is almost at the edge. That's no time to think, 'Maybe I won't make it. I'll stop here.' He *can't* stop. He's got to go faster yet, and hope and pray he makes it. We're in the same spot. Science and technology have depleted the natural resources of the earth, disturbed the balance of nature, enlarged the population. If we tried to drop science now—even if we could get everyone on earth to agree to it—we'd face a terrific explosion of hunger, disease, and misery, followed by a drop straight into barbarisms. The only visible way out is to complete the jump."

Bardeen nodded. "That's the point. Exactly."

Barrow looked at Dave almost with awe. "That's a remarkable comparison."

Bardeen, too, for some reason was looking at Dave with visible respect. Then he thanked Dave for coming over, and expressed his appreciation for Dave's help in catching the intruder. When Dave was in the hall, Barrow came out.

"Excuse me," said Barrow, frowning. "You like this girl you mentioned?"

"Very much," said Dave.

Barrow paused, his eyes unfocused. Dave waited. This was the way things often went, and the reason why Dave had been so surprised at Barrow's commonplace remark about fools on the road.

"Yes," said Barrow, "we must have an open house. Project 'S' is almost finished. That's the only way. We'll have the people here, in case—" He looked directly at Dave, and smiled. "Invite her. Show her around. Perhaps she'll see your viewpoint."

"I don't know if she'll come."

"Tell her if you can't convince her science is all right, you'll join the League. *That* will bring her." He looked Dave flatly in the eyes. "If you really like her, be sure she's here. The day after tomorrow. Before two in the afternoon."

Barrow went back into Bardeen's office.

Dave stood staring for a moment, then shook his head, and went back to the lab.

When he mentioned this to some friends, they all laughed. "That's Barrow, all right. That's our boy."

Official word soon came from Bardeen's office, and they were all excited.

"Who knows," said someone. "Maybe we'll find out what Project 'S' is."

THE day of the open house saw the wives, sweethearts, and families of the men thronging the grounds. Barrow's family was there, as was Bardeen's. And for once it was possible to move freely. Even the inner security compound was opened to the visitors, though the Project "S" building remained closed.

Anita had agreed to come, and visited the lab, but Dave's explanation of his work was no great success.

"You see," he was trying to tell her, "atoms and molecules at ordinary temperatures are in a state of rapid vibration. The properties that we take for granted, as natural characteristics of matter, actually are only *special* characteristics, dependent on the comparatively high temperature—which to us seems normal. But at such temperatures, the atoms and molecules are in a rapid state of vibration.

In cryogenics, we study matter at low temperatures."

"Are they going to have lunch outdoors?" said Anita. She was lovely, but her features were slightly pinched, as though she felt the intense cold of the cryogenics lab around her.

Dave, realizing the hopelessness of it, suppressed a grin. "How can you judge what you don't understand?"

"By its results," she said.

Dave said, "Unfortunately, I don't know yet just what the final result of all this is going to be."

"Then," she said, brightening, "we can't very well judge it, can we?" She was studying his face intently, and suddenly grinned. "You're teasing me, aren't you?"

Dave laughed. "At the beginning I was in earnest."

"I'm sorry. It just doesn't mean anything to me. I suppose a man would feel the same way if a woman described the fine points of sewing to him."

Dave nodded. "Let's go outside."

It was a beautiful day, with small fluffy clouds against a delicate blue sky, light at the horizon, and deep blue overhead. The sun was bright, and there was a brisk cool breeze that fluttered the women's dresses as they stood by the tables that were laden with potato salad, and steaming trays of hot dogs and hamburgs. Dave realized that he

was hungry. But as he and Anita started toward the crowd, abruptly Dave stopped.

The whole scene for an instant seemed unreal to him, as if it were painted on a balloon that had been blown so tight it could almost be seen through.

Anita said, "What is it?"

He shook his head. "I don't know."

He felt a compulsion again, the same feeling that had led him to press the brake pedal the other night. But this feeling was far stronger and more urgent.

Anita was watching him. "What's wrong, Dave?"

"I don't know. But I've got to find Bardeen." At that moment, he saw Bardeen, standing with Barrow a little apart from the crowd, which was now spreading out into small groups, holding paper plates and rolls, and balancing their cups.

Anita said, "I'll get you something to eat. I'll wait over here while you talk to Mr. Bardeen."

"Yes," he said. "Thanks."

BARDEEN and Barrow were standing like two statues, each of them holding a hamburger and a paper cup. Barrow had his eyes shut as Dave approached, but now he opened them.

"No chance," Barrow said. "The lasers will melt the rock in front of them and when the rock-

et passes, the additional heat, and the release of pressure, will cause sudden vaporization.

Bardeen said, "It *can't* be that hot."

"The rockets will be traveling at such a speed as to compress the laser beam longitudinally. Remember, the rockets won't be working *against* gravity. Gravity will be helping them."

Dave frowned. How could that be, unless a rocket were fired *down* into a hole? Suddenly he remembered the news broadcast. Geologists planned to study the structure of the earth by analyzing the shock waves from underground explosions.

Bardeen said, "The phenomenon will be evanescent, unstable. But it will travel right along with the rocket, which will be moving at too high a speed to be crushed from the sides by the pressure. Remember, the deep layers will liquefy, then vaporize, and the pressure of vaporization behind the rocket will plunge it deeper and faster. The top of that hole will be hell on earth. There'll be a column of vapor miles high and the uprush will blast away the sides of the hole, widening it as it goes."

"It will melt the rocket."

"Yes, but too late."

"Will it explode?"

"Yes. Very, very deep."

"So far, we have a geological expedition wiped out."

"Yes, but a nuclear explosion at that depth is going to find matter under higher pressure than in any previous experiment. When the particles from that explosion strike those close-packed atomic nuclei—"

Bardeen said tightly, "Chain reaction?"

"Yes."

"Self-sustaining?"

"I can't tell yet. A small error at the beginning would slowly cause the rocket to fall behind the wave front, and penetrate less deeply."

"If we could only warn—"

"How? We tried that once, remember?"

"I know. There's no reason for them to believe us."

Before he thought, Dave said, "What is this—precognition?"

Sam Bardeen's eyes were cool. Barrow glanced at Dave without expression, then nodded.

"So that's how you could warn me last night about fools on the road."

Bardeen cleared his throat.

Dave said, "I remembered after those fools almost finished me off twice."

Bardeen started to speak.

Barrow said, "Hold it, Sam." He frowned at Dave. "After they almost hit you twice, then you remembered?"

"That's right." Dave, thinking it over, was wondering again where these hunches came from.

What *had* made him put his foot on the brake pedal?

Bardeen started to speak.

Barrow silenced him with a raised hand. "My department, Sam." He shut his eyes for a long moment, then looked at Bardeen with a faint grin. "*Now* the twins work."

DAVE glanced from one of them to the other.

Bardeen was saying incredulously. "No waiting to match configurations?"

"They'll match on signal. This is our boy here. They'll match, if *he* gives the signal."

Bardeen glanced from Barrow to Dave, and abruptly the coldness was gone.

"You see," he said to Dave smiling, "why Dick and I have come up fast. With precognition it's possible to avoid wasted time following the wrong path."

"If," said Barrow, "the experiment first has been carefully formulated."

Dave still felt the overpowering sense of pressure.

"What are the 'twins' you spoke of?"

Barrow said, "That's Project 'S'."

Bardeen said, "Project 'S,' is a twin set of transmission stations."

"What do they transmit?"

"Matter."

"Matter?"

That's right. The structure of the matter is sent in a code that modulates a carrier wave. The matter is picked up here, converted to energy, transmitted as a finely-focused transient beam, and reverted to matter."

"The way a radio station sends a voice? One of the 'twins' is a transmitter and the other a receiver?"

"Not quite. Either one can focus on an object close enough to be encoded, send out its focused signal, and at the focus the object sent is reconstituted."

"How far away?"

"Tens of thousands of miles. Further yet, outside the Earth's gravitational field."

"Why 'twins'? Are they the same?"

"Identical."

"Why?"

"We *need* two."

"What for?"

"Because neither one can send *itself*."

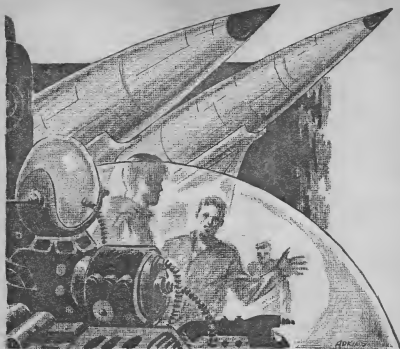
Dave looked at him blankly, then stared.

"Good Lord! The two together are a space vehicle?"

Bardeen nodded.

Barrow shut his eyes.

Dave could feel, around him, the tight-stretched balloon of the pleasant scene drawn tighter yet. The sunlight shimmered on it and it sparkled. But to Dave it seemed that any any minute it might snap and be gone.



Barrow sighed. "That does it."

Bardeen said, "Self-sustaining?"

"Self-sustaining. The picture's clear now. They'll drop that rocket with absolute precision. It's the same thing as lighting a fuse that leads straight to the dynamite shack."

Dave said, "You see this?"

Barrow nodded. "I shut my eyes, and it's right there, like a garden, in a way, and in another like an attic half-full of mirrors. All kinds of things are there, some clear, and some fuzzy, some already here, and some mirrored

as in a mirage. Those are in the future."

"How did you learn—"

"I don't know. The knack runs in my family. My mother, uncles, and children have it. It's a maddening thing, because usually you aren't interested. But there it is, the instant you shut your eyes. Mostly it's too complex to follow the interlocking chains of cause and effect. But with a scientific experiment, it's different. So far as possible, extraneous factors are ruled out, and the chains of cause and effect are simplified. To that extent, it be-

comes possible to predict results accurately."

"And the accident I almost had?"

"A matter of probabilities. I could see just enough to tell you'd be in danger."

Bardeen said, "How will this —" but didn't finish the question. He looked at Dave. "It's all up to you now. Come on."

Bardeen started for the Project "S" lab. Barrow waited to speak to several of the men, then followed.

THE "twins" were two huge cylinders lying side-by-side, mirrored in each other's brilliant stainless surface. Above each, near the center, was an apparatus like a wide, polished hoop. Thrust out on both sides of each huge cylinder were two short wide braces, each one powerfully hinged at the outer end to a long slender arm. At the end of each arm was a thing like a smooth bright dish. The four arms were held almost vertically, prevented, by heavy coil springs on the cylinder, from touching each other.

Bardeen said, "That short cylinder, or hoop, in the center, can detect and record very complex electromagnetic forces. When the twins are in action, a housing rises up behind it and a sequence of fine penetrating beams of coding radiation reaches out to pass through every part of the object

being sent. This structural information will be received in the form of faint, brief complex echoes—reflections from the atoms struck by the coding beam. These echoes will be interpreted, stored, and used to help modulate the carrier wave sent out from the ends of the four transmission arms, which will be lowered, and adjusted to focus on a distant place.

The coding beam is of a type of radiation we discovered in studying the various forms of instability that occur in an experimental fusion reactor. We call it 'efflux radiation'."

Dave, concentrating hard under the increasing sense of pressure, nodded briefly, and Bardeen said, "Efflux radiation is to ordinary radiation much as contra-terrene matter is to terrene matter."

"What does it do?"

"When an efflux ray strikes ordinary matter, that matter is converted into ordinary radiation, traveling in precisely the opposite direction. The total effect is that the atoms of the object sent, and everything in it, *are converted into electromagnetic radiation, which is sent out through the focused transmitter, and reassembled far away.*"

Dave nodded slowly. "You said I was needed. Why?"

"The trouble with this process is that we have great difficulty

bringing about the form of instability that generates efflux radiation. The worst of it is that the proper form of instability must occur simultaneously, in *both twins*, if the process is to be successful."

"What do you mean?"

"Both of these cylinders are fitted out as colonization spaceships. We have a whopping government contract for this work, which is certain—was certain—to put this country far ahead of any other in space. Because after one of these two ships transmits the other, that *other ship focuses on and transmits the first*. But the proper type of instability to generate efflux radiation must occur in both ships simultaneously, because if only one has it, the other may be carried out of range before it can do its part."

"What can I do about that? I never heard of efflux radiation before. I don't know the first thing about it."

Barrow smiled. "Last night you were wrestling an intruder when a volley of shots was fired at him. He was killed. You were not touched. A moment before that volley of shots, he was shooting at you himself from a distance of possibly two feet. You weren't touched. Shortly after, you were in a deadly situation on the highway, again untouched."

"Yes, but what did *I* have to do—"

"Did you ever hear the expression 'wild talents'?"

"Yes. Sure, but—"

"Within limits, I can foresee the future—that's precognition. But you have a deeper control of time and motion relationships. It may be as automatic and unconscious as the blink of an eye, but it's there. And we need it."

THE crowd was coming into Project "S" building. They looked tense, white-faced, scared.

Dave could feel the pressure, all but unbearable.

"What do I do?"

Barrow led him inside one of the huge cylinders, and down a corridor that had wide strips of strong black mesh on both walls.

"For getting around," said Barrow, "when we're in space. You take hold of the mesh. We have no arrangement for artificial gravity on these ships."

He unlocked a door marked "No Admittance," and there before Dave was a softly-polished panel with a large black circular screen marked off in radians, and two centers of intense violet light, surrounded by an oscillating purple region, its boundary shifting irregularly from moment to moment. Just beside the panel was a lever marked "Danger—Manual Interlock." On the pale green wall nearby was an intercom unit.

Barrow said, "These two centers of light represent the ships' fusion reactors. As long as a band of purple exists around either center, conditions are wrong to move the ship. When the purple disappears, and there are only the two centers of violet light, we have simultaneous efflux instability. *Then* pull back that lever."

"We have just a few minutes," said Barrow. "When everyone's on board, I'll speak to you through that intercom."

The door clicked shut.

Dave looked at the pale-green door, then turned to urgently will the writhing purple boundary out of existence.

Unaffected, the two bright violet centers swam in a twisting pool of purple.

Dave's heart pounded, and he felt dizzy with effort. But nothing happened.

There was a click from the wall speaker.

"All right, Dave. Everyone's on board. We've opened the dome of the building. Go ahead."

Dave opened his mouth to demand more time, to insist on an explanation—and a calmness slid over him suddenly. The intensity of the pressure was suddenly gone. the writhing purple shrank into the violet centers of light.

Unhesitatingly, Dave pulled back the lever.

There was blurring of consciousness, suggesting a room seen in a rapidly flickering light.

Then Barrow's voice was saying, "Break interlock."

Dave shoved forward the lever.

Once more, consciousness was continuous. He had a strange feeling as if he had raced over the precisely-spaced railroad ties after a train, and had finally caught it and hauled himself aboard.

He glanced at the intercom.

"Will you need me right away?"

"Not where you are. Come up to the viewer. You turn to your left as you go out, and up the ladder to your right."

"Be right up."

Dave tried to turn around, and promptly drifted up from the floor. It was only then that he really believed it.

It had worked.

They were out in space.

EARTH hung on the screen before them like a big blue-green basketball with a tiny incandescent plume bursting from its equator.

Anita, her face pale, was clinging to Dave as they watched the screen. The crowd around them was tense and silent, their gaze riveted on the screen.

Bardeen and Barrow were nearby. Bardeen murmured, "It's started?"

"Yes." Barrow's eyes were shut.

"Self-sustaining?"

"It must be."

On the screen, the blazing plume strengthened and grew brighter.

Dave held his breath.

The single flame erupted into a blazing circle that shot around the globe.

The terrible heat flashed the nearby seas into vapor, huge cracks appeared, and the sudden violence hurled up chunks of the solid planet that were the size of mountains. Then the blinding scene was blurred by dense expanding clouds of vapor.

How long they'd watched, Dave didn't know, but he felt worn-out and sick. He held Anita, who was crying miserably and quietly.

Bardeen turned wearily from the screen. "Any chance of the fragments fusing themselves together again?"

Barrow shook his head. "Just another asteroid belt. Maybe that's what caused the first one."

Dave forced his dulled mind to assess the situation. Science had destroyed a planet. And science had enabled a few survivors to escape in ships especially equipped to colonize another planet.

Bardeen, apparently thinking along the same line, said, "At least these ships are equipped to make us self-sustaining. We have advanced equipment, and the reactors put more energy at our disposal than the whole human race had twenty years ago. We can start again."

Anita looked up. "And try *more* scientific experiments? How long before the *next* mistake?"

"Ask Dave," Bardeen said quietly, "and he'll tell you our method is different. An experiment isn't an experiment when you can foresee the result, and stop in time."

He turned to the screen where the blaze of light glowed through boiling clouds of vapor.

"That," he said, "was the last experiment."

THE END

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INTERSTELLAR FLIGHT

By BEN BOVA

IMAGINE, if you can, an "Open End" television show in which the moderator is not David Susskind, but a science fiction writer. Gathered around the coffee table with him are a battery of experts in every field of science. The science fiction writer opens the discussion:

"Edgar Rice Burroughs, writing some 50 years ago, had a much easier time of it than modern science fiction writers. When he wanted to depict strange and wondrous places for his stories, he simply placed his plot on Mars and populated the planet with exotic civilizations and exciting characters.

"But readers today know too much about Mars to allow a modern writer such latitude. Astronomy has progressed to the point where the readers of science fiction know darned well that Mars has virtually no oxygen and nearly no water. And the rest of the solar system has been de-

enchanted, too. Venus is suffocatingly hot. Mercury is airless. The giant planets are so inhospitable that there's a real question as to whether men will ever see below their cloud decks. Pluto is a cryogenic question mark.

"So where does today's science fiction writer turn if he wants to build a bizarre alien culture? Why, to the stars, of course. And that's our subject, gentlemen. You're going to tell me how to get to the stars."

"Impossible!" retorts the physicist. "You just can't get to the stars. A rocket would have to reach a burnout velocity of 36,000 miles per hour to escape from the Sun's gravitational pull. And at that speed it would take something like 80,000 years to reach Alpha Centauri, the next nearest star. Even if you could travel at the speed of light—which can't be done—it would take 4.3 years to get to Alpha Centauri."

The science fiction writer snaps his fingers. "Hyperspace," he retorts. "I can send a ship into super-light overdrive and leave this continuum for a different dimensional coordinate system. In hyperspace my ship can travel at any speed I like. I can get my hero to Aldebaran VI just in time to win a battle . . . or just late enough to allow the heroine to have been abducted by the tarantula people . . ."

The physicist shakes his head. "Gibberish. You just invented hyperspace as a convenience."

"Not me," the writer counters. "The mathematicians did. And anyway, since you can't prove that I'm wrong, the idea is still useful. Science fiction can always use science that hasn't been proved to be wrong. Right?"

Muttering something about the conservation of energy, the physicist sinks back into his chair.

Distance and the Barrier

THE physicist has good cause to be upset," the engineer says. "Although it seems that flight through the solar system is a problem that can be licked by engineering, flight to the stars is an altogether different proposition. The distances involved are on the order of millions of times larger than inter-

planetary distances—which themselves are measured in the millions and even billions of miles."

The astronomer takes over the conversation and points out that light, travelling at an unvarying vacuum speed of 186,000 miles per second, goes some 93 million miles from the Sun to Earth in about eight minutes. To get from the Sun to Jupiter—about 483 million miles—light takes slightly more than 40 minutes. And it takes light about five hours to span the three-billion-mile distance between the Sun and Pluto. But to reach Alpha Centauri takes light 4, 3 *years*. Sirius, the brightest star in Earth's night sky, is some eight lightyears away. Giant Rigel is about 300 lightyears distant. "Far more than clever engineering is required to conquer distances such as these," the astronomer concludes. "And light-speed seems to be a fundamental barrier."

"That's right," the physicist agrees. "Nothing in the universe has been observed to travel faster than light. Probably nothing can."

The science fiction writer frowns. "The 'light barrier' sounds something like the 'sound barrier' that the engineers broke through some 15 years ago."

All the scientists groan in protest. The engineer explains that

the speed of sound was known to be no fundamental barrier. The problem was that a plane flying at the speed of sound (Mach 1) generates a shock wave. The shock wave compresses the air ahead of it—piles it up in a thickening blanket. The effect is something like trying to fly through a not-quite-solid wall. But eventually planes were designed—and powered—to fly through the “sound barrier” and trail the shock wave behind them. (It is the shock wave generated continuously by a plane in supersonic flight that people on the ground hear as a “sonic boom.” The boom does not occur only when the plane goes past Mach 1.)

The speed of light, though, is an altogether different matter, the physicist says. Indeed, theoretical considerations state that nothing can exceed the speed of light. It is a fundamental barrier. Near lightspeed, the basic physical relationships among matter, energy and time change so radically that the delicate balances of human biochemistry perhaps would not survive.

For example, in some of the powerful synchrotrons, electrons have been accelerated to within a few percent of the speed of light. At these speeds, when more energy is imparted to the electron, its velocity does not increase appreciably. But its mass

grows! No matter how much energy is pumped into the electron, it never reaches the speed of light. The energy changes into mass.

Tinkering with Time

AS the physicist stops to take a sip of coffee, the mathematician says, “Even though the physicist and engineer cannot build you a ship that goes as fast as light, I can show you what would happen if such a ship existed.”

“You can?” asks the science fiction writer.

“Of course,” the mathematician replies, a trifle smugly. “Please remember that a mathematician named Newton showed 300 years ago that an artificial satellite could be established in orbit. Mathematicians can tell you what the stars will look like a thousand years from now, or what interactions a mu-meson will undergo in its first millionth of a second of lifetime, or . . .”

“Okay, okay,” says the science fiction writer. “What about lightspeed ships?”

First, the mathematician says, it is not necessary to travel exactly at the speed of light. If a ship came to within a few percent of light-speed, relativistic effects would dominate. The mathematics of relativity tell us that as a ship approaches light speed, time aboard the ship

slows down. A clock on the ship would tick slower and slower as the speed came closer to that of light. Everything aboard the ship—human biochemistry included—would slow down with respect to time on Earth. But aboard the ship itself, nothing would seem to change. Everything would seem normal, even though years might pass on Earth before a second elapses aboard the ship.

This is the basis of the famous "twin paradox" of relativity. If one brother stays on Earth while his twin flies to a star at nearly the speed of light, the flying twin will return to Earth younger than the brother he left behind. The German mathematician, Eugene Sänger, gives the following example: A ship flying at more than 90% of the speed of light travels 1000 lightyears to Polaris, the North Star. Ignoring such trivial details as time spent accelerating up to top speed and decelerating to landing speed again, the ship could make the flight to Polaris and back to Earth in a subjective time of 20 years, roundtrip. But when it returns to Earth, our planet will have aged slightly more than 2000 years!

"Still," says the science fiction writer, somewhat subdued but not beaten yet, "if we could fly at speeds close to light-speed, we could reach the stars. There's no

necessity of breaking the 'light barrier' to get to the stars."

"Not to *the* stars," says the astronomer, with a heavy countenance. "Just to a handful of stars, a mere handful. Even at light-speed, the stars are too far away."

The mathematician disagrees. "Come now, astronomer. Sänger showed that you could circumnavigate the entire universe in a subjective time of only about 40 years, if you fly at 99% the speed of light."

"And return to an Earth that is five billion years older than when you left it," the astronomer counters. "Who would engage on such a venture? How could you know the Earth would still exist after such a time?" The astronomer goes on to demonstrate the problem. Within a radius of roughly 16 lightyears from the Sun there are 40 stars (some of which are double and triple systems). If one could travel at the speed of light, roundtrips to the closest star—Alpha Centauri—would take more than eight Earth-years, from start to finish of the journey, regardless of the subjective elapsed time aboard ship. When the ship returned to Earth from Alpha Centauri, more than eight years would have elapsed on Earth. To reach the farthest of these stars, explorers would be away from Earth for a total of

more than 32 years. The explorers themselves might not age quite 32 years on the expedition, but their wives and families and associates would be more than 32 years older when the expedition returned to Earth.

SO far we have been talking about stars in the Sun's immediate neighborhood. Now look at the whole picture. We said earlier that Rigel is about 300 lightyears away, and Polaris, 1000 lightyears. Already you can see that, even if a man travelled at light-speed, he would have to bid a final farewell to the Earth he knows before sailing off. It is as though Columbus had left Spain in 1492 and returned in 1800—just in time for the Napoleonic wars. Or if Lief Erikson had departed from Scandinavia around 1000 A.D. and would not return until 3000 A.D.

And Rigel and Polaris are still relatively close to the Sun! Consider the size of the Milky Way galaxy. The Sun is some 25,000 lightyears from its center. The galaxy is about 100,000 lightyears in diameter, and some 30,000 lightyears thick at its widest part. It contains about 100 billion stars, with enough free gas and dust between the stars to build about another 100 billion. And the Milky Way is only one galaxy out of billions that have been observed. The

nearest are the Magellanic Clouds, small satellite galaxies of our Milky Way, some 150,000 lightyears away. The closest spiral galaxy is M 31 in Andromeda, about two million lightyears from us. Galaxies have been seen at distances of six to eight billion lightyears.

"That's enough," the science fiction writer protests, slightly green in the face. "I'm willing to confine my stories to the Milky Way. A hundred billion stars seems good enough for the time being."

"Do you seriously think," the astronomer asks, "that reasonable men would want to fly to distant stars and return to an Earth on which centuries or even millenia had passed? I doubt it."

The writer is silent for a long moment. Finally he asks softly, "What about hyperspace?"

The Other Side of the Barrier

"Hyperspace is a mathematical invention," the mathematician says, then adds, "Unfortunately, like so much of mathematics, it does not necessarily have any relation to the real world. There is no reason to assume that the three dimensions of space that we can experience—length, breadth, and height—are the only ones in existence. We already consider time as a fourth dimension, but not a spa-

tial one. There could be other dimensions, unknown to man."

"Sure," the science fiction writer says, brightening. "And maybe we'll find out about them once we're out in space. After all, what we know about the universe is pretty pitiful, as long as we're confined to this one planet."

The mathematician agrees, but then points out that additional dimensions do not necessarily make it easier to fly to the stars. "In science fiction stories, travel through hyperspace is always quicker than travel through ordinary three-dimensional space. But why should this be true? It could just as easily be longer. And a question that has always intrigued me was: how do you navigate in hyperspace?"

The science fiction writer looks so perplexed that the mathematician decides to cheer him up.

"Although hyperspace may not be the boon to interstellar travel that it has been cracked up to be, I think I can show you what it would be like if you *could* break through the 'light barrier.'"

"But I thought that's impossible."

"It may well be," the mathematician admits, "to the physicist. But to a mathematician, the speed of light is just another speed. Higher speeds can be postulated, mathematically. Re-

member, mathematics need not deal with the real world all the time.

"The mathematician R. T. Jones has investigated the kinematics of faster-than-light travel. You recall that as one goes faster and faster, approaching the speed of light, subjective time slows down; the twin aboard ship ages more slowly than the twin on Earth. At exactly the speed of light, subjective time seems to vanish. The flying twin can go any distance instantaneously, it seems to him. But to the twin on Earth, of course, his brother is flying at light-speed; it takes 10 years to cover a distance of 10 lightyears. Now, as the flying twin *exceeds* the speed of light, time begins to speed up again for him. At nearly twice light-speed, subjective time aboard ship is exactly equal to elapsed time on Earth. At infinite speed, subjective time aboard ship is equal to the light time.

"Thus, you have an even stranger 'twin paradox.' If a ship can travel infinitely fast, it could fly to Polaris and return in *zero time*—from the standpoint of the twin remaining on Earth. But the twin in the ship would age 2000 years!

"He'd be dead of old age before he got halfway there," the science fiction writer says gloomily, "even though it would seem

on Earth as though he made it to Polaris and back instantaneously."

A polite cough from the other side of the table turns everyone's head toward the biochemist. "Perhaps your faster-than-light twin can make it after all. Why can't you slow down his metabolic rate so that he doesn't age at all during the flight?"

"Suspended animation?"

With a slightly uncomfortable look, the biochemist says, "You could call it that. I'm sure that by the time we're ready to tackle the stars, a technique will have been found to freeze a human being indefinitely. You could freeze the twin at takeoff and revive him when he arrives at Polaris. Subjectively—and physically—he won't be one minute older than when he took off."

"Then that's it!" the science fiction writer exclaims. "With a ship that flies at infinite speed, and suspended animation, a man can go anywhere in zero elapsed time!"

The mathematician and biochemist agree with the broadly-smiling writer. But the physicist raises a heavy hand of objection:

"All this would be true," he says, "if you could fly faster than light, I agree. But I must point out that, as far as physics can determine, you cannot ex-

ceed—you cannot even reach—the speed of light."

Interstellar Engineering

"All right, then," the science fiction writer says, at last. "Let's change our tack. Let's stick to what we know can be actually engineered. No new scientific discoveries—no faster-than-light travel. Can man still reach the stars, and if so, how?"

"Well," says the engineer, "there's always the old interstellar ark. You know, a huge ship with a completely self-sufficient colony aboard. They'd sail out to the stars at speeds not much greater than solar escape velocity. It would take generations and generations, but they could get there eventually."

The psychiatrist lifts his eyebrows. "I doubt that normal, well-adjusted human beings would ever embark on such a journey. How could they, in good conscience, doom several generations of their offspring to live and die aboard the ark? How do they know that the generation that eventually reaches the destination star will want to live there?"

"Or," the physicist adds, "that another group, in a faster ship, hasn't beaten them to it?"

"Even leaving that possibility aside," the psychiatrist continues, "no group of human beings who could be considered normal

would ever contemplate such a mission. Why, they would have to be a group of exiles. Or religious fanatics."

The science fiction writer muses thoughtfully, "Not bad ideas for a story or two."

The engineer asks, "Would you consider a rocket system based on hydrogen fusion power within the rules of the game we're now playing?"

"No one has built a successful fission rocket yet," the physicist points out. "And the only method of liberating fusion energy known to man at present is the H-bomb."

"I know," the engineer admits. "But, in principle, at least, we know that we will someday be able to harness fusion power. It will make a tremendous propulsion system."

The engineer goes on to explain about a study undertaken by Dwain F. Spencer and Leonard D. Jaffe of the California Institute of Technology's Jet Propulsion Laboratory. Assuming that fusion rockets can be built, they conclude that a five-stage vehicle—using fusion power in every stage—could make a round-trip flight to Alpha Centauri in a total elapsed Earth time of 29 years. The ship would accelerate at 1 *g* for a few months until it reached relativistic velocity, then coast most of the way to Alpha Centauri,

where it would decelerate to orbital speed. The same procedure would be followed for the return trip.

"The 29 years would seem shorter to the men making the flight, of course," the engineer says.

"And that's using power that we know we can harness," the writer enthuses. "No need to call in anti-matter or space warps. Why, maybe by the end of the century we can reach Alpha Centauri!"

"Excuse me," says the astronomer. "Have any of you ever heard of the Bussard Interstellar Ramjet?"

The Interstellar Ramjet

R. W. BUSSARD, of the Los Alamos Scientific Laboratory (the astronomer relates) has pointed out that the fusion rocket is limited in that it must carry all of its propellant mass along with it. Spencer and Jaffe's five-stage fusion rocket, for example, must be at least 90% hydrogen propellant. This means that the rocket engine spends most of its energy pushing its own propellant mass. The situation becomes a vicious circle. As long as you must carry all the rocket's propellant along with you, any increase in speed must be paid for by more propellant mass. When you are considering flight at close to the speed of

light, this becomes a serious obstacle. It poses a fundamental limitation on the energy you can get out of the fusion rocket.

But suppose the interstellar ship did not have to carry any propellant at all? Its fusion rocket could perform much more efficiently. And the ship's range would be unlimited—it could go anywhere, at close to lightspeed, as long as it could somehow find propellant and feed it to its engine.

Now, interstellar space is filled with such a propellant for a hydrogen fusion rocket: hydrogen gas. There is as much free gas in the Milky Way, by mass, as there are stars. That works out, very approximately, to 2×10^{38} metric tons (considering that there are 10^{11} stars in the Milky Way, and they are on the average of the same mass as our Sun, 2×10^{27} metric tons). While this is an enormous amount of available fuel, the interstellar gas is spread very thinly through space. In most regions of the Milky Way it can hardly be more than a few atoms per cubic centimeter (although there are many denser regions, such as the Great Nebula of Orion).

The Interstellar Ramjet, then, will need a gas-scoop of considerable—one might be tempted to say, astronomical—size. A circular funnel 2000 kilometers in

radius will be required to scoop up the tenuous gas in the normal regions of the galaxy. That is for a ship with a payload of 1000 metric tons—a trim little craft indeed. If one wishes to steer the ship through dense clouds of gas, and then coast onward between clouds, a scoop only some 60 kilometers in radius is required. The scoop, of course, can be lightly built. If only *ionized* gas is scooped, the funnel can be a magnetic field, instead of solid material. Ionized gas occurs near hot stars; it is relatively prevalent along the outer arms of the Milky Way, but probably rare at the core of the galaxy.

One can picture, then, a starship that uses the interstellar gas itself for fuel. The engineering problems of building a workable (not to mention efficient) hydrogen fusion engine are staggering. The engineering problems of building a 2000-kilometer-radius scoop are more than formidable, even though the scoop will have very little pressure on it. It will, however, be under a constant $1 g$ acceleration, since the ship will be either accelerating or decelerating at $1 g$ at all times. But these are engineering problems, not fundamental limitations. In time, they can be solved.

"Wait a minute," says the physicist. "If you accelerate con-

tinuously at 1 *g*, you will very quickly begin to run into diminishing returns. The ship's mass will increase, and additional inputs of energy will go more toward mass increase than acceleration."

The astronomer shrugs elaborately. "So what? We're getting the fuel for free. Why not continue to accelerate? Every increment in velocity helps."

"This Interstellar Ramjet can really work, then?" the writer asks, almost afraid to believe it can be true.

"It works quite well, on paper," the astronomer replies. "According to Carl Sagan, of Harvard College Observatory, the ship can reach the nearest stars in a few years—of ship time, that is. The center of the galaxy would be 21 years away, and the great spiral in Andromeda, 28 years away. Of course, the elapsed times on Earth would be tens of thousands, even millions of years."

THE biochemist says, "The trip time, as sensed by the ship's crew, could be virtually zero if you freeze the crew just after takeoff and revive them just prior to arrival at their destination."

"I must point out," the psychiatrist objects, "that you still have a basic problem of motivation on your hands. Who would

want to leave the Earth, knowing that he would return to a world several thousand years older than the one he left?"

"It would be a one-way trip, in a sense," the writer muses. "Maybe the crew members would want to bring their families with them. Once they left Earth, they could never return to the time they were born into."

"Nothing man has ever done before even comes close to that experience," the psychiatrist says.

"Oh, I'm not so sure about that," the anthropologist objects. "The Polynesians settled the islands of the central Pacific on a somewhat similar basis. Their expansion through the region was somewhat haphazard—a mixture of deliberate emigrations into the unknown plus accidental landings on new islands as the result of storms and other mishaps. But they ventured out onto the broad Pacific, which must have seemed as dark and dangerous to them as space does to us. They left their homes behind—although they usually took their immediate families. They did not expect to return at all."

"That is somewhat similar," the psychiatrist agrees.

"So we can reach the stars after all," the science fiction writer says. "It's not fundamentally impossible."

The mathematician chuckles to himself, "Goodness, we have not even been particularly imaginative. You know, the principles of relativity have only been worked out for point-masses. No one has calculated the effects of relativistic velocities on waves. I've been waiting for someone to suggest an instantaneous matter transmitter that breaks down matter into energy waves and beams the waves at infinite velocity to a receiver that reconstructs the original payload."

The physicist's glower is enough to make the science fiction writer decide to drop that subject.

"Imagine a galaxy where Interstellar Ramjets travel from star to star."

Could there be commerce between civilizations separated by lightyears of distance and time? Could there be wars between states when an attack and counterattack would be centuries or even millenia apart?

"Probably not," the writer answers his own questions. "But there could be *contacts*. People

would be forced to think and plan ahead in terms of centuries. And what an age for adventure!"

The mathematician, grinning maliciously, adds, "And if a space-traveller should deposit a few dollars in a savings account, and then return a century or two later—what an age for compound interest!"

The science fiction writer turns his beaming face to the panel of experts and thanks each one of them in turn.

"You have certainly answered my original question, gentlemen. I can now write about interstellar travel with complete confidence. My ships will be Interstellar Ramjets. My heros will be frozen during transit from star to star—why, they'll become virtually immortal! Each trip will take them ahead in time so much that they will never know what to expect at their destination. Edgar Rice Burroughs, hah! Barsoom was an old man's home compared to what the *real* world has to offer!"

THE END

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SKELETON MEN



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OF JUPITER

by Edgar Rice Burroughs

I AM no scientist. I am a fighting man. My most beloved weapon is the sword, and during a long life I have seen no reason to alter my theories as to its proper application to the many problems with which I have been

faced. This is not true of the scientists. They are constantly abandoning one theory for another one. The law of gravitation is about the only theory that has held throughout my lifetime—and if the earth should suddenly



start rotating seventeen times faster than it now does, even the law of gravitation would fail us and we would all go sailing off into space.

Theories come and theories go—scientific theories. I recall that there was once a theory that Time and Space moved forward constantly in a straight line. There was also a theory that neither Time nor Space existed—it was all in your mind's eye. Then came the theory that Time and Space curved in upon themselves. Tomorrow, some scientist may show us reams and reams of paper and hundreds of square feet of blackboard covered with equations, formulae, signs, symbols, and diagrams to prove that Time and Space curve out away from themselves. Then our theoretic universe will come tumbling about our ears, and we shall have to start all over again from scratch.

Like many fighting men, I am inclined to be credulous concerning matters outside my vocation; or at least I used to be. I believed whatever the scientists said. Long ago, I believed with Flammarion that Mars was habitable and inhabited; then a newer and more reputable school of scientists convinced me that it was neither. Without losing hope, I was yet forced to believe them until I came to Mars to live. They still insist that Mars is neither

habitable nor inhabited, but I live here. Fact and theory seem to be opposed. Unquestionably, the scientists appear to be correct in theory. Equally incontrovertible is it that I am correct in fact.

In the adventure that I am about to narrate, fact and theory will again cross swords. I hate to do this to my long-suffering scientific friends; but if they would only consult me first rather than dogmatically postulating theories which do not meet with popular acclaim, they would save themselves much embarrassment.

DEJAH THORIS, my incomparable princess, and I were sitting upon a carved ersite bench in one of the gardens of our palace in Lesser Helium when an officer in the leather of Tardos Mors, Jeddak of Helium, approached and saluted.

"From Tardos Mors to John Carter, kaor!" he said. "The jeddak requests your immediate presence in the Hall of Jeddaks in the imperial palace in Greater Helium."

"At once," I replied.

"May I fly you over, sir?" he asked. "I came in a two seater."

"Thanks," I replied. "I'll join you at the hangar in a moment." He saluted and left us.

"Who was he?" asked Dejah Thoris. "I don't recall ever having seen him before."

"Probably one of the new officers from Zor, whom Tardos Mors has commissioned in the Jeddak's Guard. It was a gesture of his, made to assure Zor that he has the utmost confidence in the loyalty of that city and as a measure for healing old wounds."

Zor, which lies about three hundred eighty miles southeast of Helium, is one of the more recent conquests of Helium and had given us a great deal of trouble in the past because of treasonable acts instigated by a branch of its royal family led by one Multis Par, a prince. About five years before the events I am about to narrate occurred, this Multis Par had disappeared; and since then Zor had given us no trouble. No one knew what had become of the man, and it was supposed that he had either taken the last, long voyage down the river Iss to the Lost Sea of Korus in the Valley Dor or had been captured and murdered by members of some horde of savage Green men. Nor did anyone appear to care—just so he never returned to Zor, where he was thoroughly hated for his arrogance and cruelty.

"I hope that my revered grandfather does not keep you long," said Dejah Thoris. "We are having a few guests for dinner tonight, and I do not wish you to be late."

"A few!" I said. "How many?"

two hundred or three hundred?"

"Don't be impossible," she said, laughing. "Really, only a few."

"A thousand, if it pleases you, my dear," I assured her as I kissed her. "And now, good-by! I'll doubtless be back within the hour." That was a year ago!

As I ran up the ramp toward the hangar on the palace roof, I had, for some then unaccountable reason, a sense of impending ill; but I attributed it to the fact that my tete-a-tete with my princess had been interrupted.

The thin air of dying Mars renders the transition from day to night startlingly sudden to an earthman. Twilight is of short duration owing to the negligible refraction of the sun's rays. When I had left Dejah Thoris, the sun, though low, was still shining; the garden was in shadow, but it was still daylight. When I stepped from the head of the ramp to that part of the roof of the palace where the hangar was located which housed the private fliers of the family, dim twilight partially obscured my vision. It would soon be dark. I wondered why the hangar guard had not switched on the lights.

In the very instant that I realized that something was amiss, a score of men surrounded and overpowered me before I could draw and defend myself. A voice cautioned me to silence. It was the voice of the man who had

summoned me into this trap. When the others spoke, it was in a language I had never heard before. They spoke in dismal, hollow monotone—expressionless, sepulchral.

THEY had thrown me face down upon the pavement and trussed my wrists behind my back. Then they jerked me roughly to my feet. Now, for the first time, I obtained a fairly good sight of my captors. I was appalled. I could not believe my own eyes. These things were not men. They were human skeletons! Black eye sockets looked out from grinning skulls. Bony, skeletal fingers grasped my arms. It seemed to me that I could see every bone in each body. Yet the things were alive! They moved. They spoke. They dragged me toward a strange craft that I had not before noticed. It lay in the shadow of the hangar—long, lean, sinister. It looked like an enormous projectile, with rounded nose and tapering tail.

In the first brief glance I had of it, I saw fins forward below its median line, a long, longitudinal aileron (or so I judged it to be) running almost the full length of the ship, and strangely designed elevator and rudder as part of the empennage assembly. I saw no propellers; but then I had little time for a close examination of the strange craft, as I was

quickly hustled through a doorway in its metal side.

The interior was pitch dark. I could see nothing other than the faint light of the dying day visible through long, narrow port-holes in the ship's side.

The man who had betrayed me followed me into the ship with my captors. The door was closed and securely fastened; then the ship rose silently into the night. No light showed upon it, within or without. However, I was certain that one of our patrol ships must see it; then, if nothing more, my people would have a clue upon which to account for my disappearance; and before dawn a thousand ships of the navy of Helium would be scouring the surface of Barsoom and the air above it in search of me, nor could any ship the size of this find hiding place wherein to elude them.

Once above the city, the lights of which I could see below us, the craft shot away at appalling speed. Nothing upon Barsoom could have hoped to overhaul it. It moved at great speed and in utter silence. The cabin lights were switched on. I was disarmed and my hands were freed. I looked with revulsion, almost with horror, upon the twenty or thirty creatures which surrounded me.

I saw now that they were not skeletons, though they still close-

ly resembled the naked bones of dead men. Parchmentlike skin was stretched tightly over the bony structure of the skull. There seemed to be neither cartilage nor fat underlying it. What I had thought were hollow eye sockets were deep set brown eyes showing no whites. The skin of the face merged with what should have been gums at the roots of the teeth, which were fully exposed in both jaws, precisely as are the teeth of a naked skull. The nose was but a gaping hole in the center of the face. There were no external ears—only the orifices—nor was there any hair upon any of the exposed parts of their bodies nor upon their heads. The things were even more hideous than the hideous kaldanes of Bantoom—those horrifying spider men into whose toils fell Tara of Helium during that adventure which led her to the country of The Chessmen of Mars; they, at least, had beautiful bodies, even though they were not their own.

The bodies of my captors harmonized perfectly with their heads—parchment-like skin covered the bones of their limbs so tightly that it was difficult to convince one's self that it was not true bone that was exposed. And so tightly was this skin drawn over their torsos that every rib and every vertebra stood out in plain and disgusting relief. When they stood directly in front of a

bright light, I could see their internal organs.

They wore no clothing other than a G string. Their harness was quite similar to that which we Barsoomians wear, which is not at all remarkable, since it was designed to serve the same purpose—supporting a sword, a dagger, and a pocket pouch.

Disgusted, I turned away from them to look down upon the moon bathed surface of my beloved Mars. But where was it! Close to port was Cluros, the farther moon! I caught a glimpse of its surface as we flashed by. Fourteen thousand five hundred miles in a little more than a minute! It was incredible.

The red man who had engineered my capture came and sat down beside me. His rather handsome face was sad. "I am sorry, John Carter," he said. "Perhaps, if you will permit me to explain, you will at least understand why I did it. I do not expect that you will ever forgive me."

"Where is this ship taking me?" I demanded.

"To Sasoom," he said.

Sasoom! That is the Barsoomian name for Jupiter—three hundred and forty-two million miles from the palace where my Dejah Thoris awaited me!

CHAPTER II

FOR some time I sat in silence, gazing out into the inky black

void of space, a gygian backdrop against which stars and planets shone with intense brilliancy, steady and untwinkling. To port or starboard, above, below, the heavens stared at me with unblinking eyes—millions of white hot, penetrating eyes. Many questions harassed my mind. Had I been especially signalled out for capture? If so, why? How had this large ship been able to enter Helium and settle upon my landing stage in broad daylight? Who was this sad faced, apologetic man who had led me into such a trap? He could have nothing against me personally. Never, before had he stepped into my garden, had I seen him.

It was he who broke the silence. It was as though he had read my thoughts. "You wonder why you are here, John Carter," he said. "If you will bear with me, I shall tell you. In the first place, let me introduce myself. I am U Dan, formerly a padwar in the guard of Zu Tith, the jed of Zor who was killed in battle when Helium overthrew his tyrannical reign and annexed the city.

"My sympathies were all upon the side of Helium, and I saw a brilliant and happy future for my beloved city once she was a part of the great Heliumetic empire. I fought against Helium; because it was my sworn duty to

defend the jed I loathed—a monster of tyranny and cruelty—but when the war was over, I gladly swore allegiance to Tardos Mors, jeddak of Helium.

"I had been raised in the palace of the jed in utmost intimacy with the members of the royal family. I knew them all well, especially Multis Par, the prince, who, in the natural course of events, would have succeeded to the throne. He was of a kind with his father, Zu Tith—arrogant, cruel, tyrannical by nature. After the fall of Zor, he sought to foment discord and arouse the people to revolt. When he failed, he disappeared. That was about five years ago.

"Another member of the royal family whom I knew well was as unlike Zu Tith and Multis Par as day is unlike night. Her name is Vaja. She is a cousin of Multis Par. I loved her and she loved me. We were to have been married, when, about two years after the disappearance of Multis Par, Vaja mysteriously disappeared."

I DID not understand why he was telling me all this. I was certainly not interested in his love affair. I was not interested in him. I was still less interested, if possible, in Multis Par; but I listened.

"I searched," he continued. "The governor of Zor gave me every assistance within his pow-

er, but all to no avail. Then, one night, Multis Par entered my quarters when I was alone. He wasted no time. He came directly to the point.

"I suppose," he said, "that you are wondering what has become of Vaja."

"I knew then that he had been instrumental in her abduction; and I feared the worst, for I knew the type of man he was. I whipped out my sword. 'Where is she?' I demanded. 'Tell me, if you care to live.'"

"He only laughed at me. 'Don't be a fool,' he said. 'If you kill me you will never see her again. You will never even know where she is. Work with me, and you may have her back. But you will have to work fast, as I am becoming very fond of her. It is odd,' he added reminiscently, 'that I could have lived for years in the same palace with her and have been blind to her many charms, both mental and physical—especially physical.'"

"Where is she?" I demanded. "If you have harmed her, you beast—"

"Don't call names, U Dan," he said. "If you annoy me too greatly I may keep her for myself and enlist the services of some one other than you to assist me with the plan I had come to explain to you. I thought you would be more sensible. You used to be a very sensible man; but then, of course,

love plays strange tricks upon one's mental processes. I am commencing to find that out in my own case.' He gave a nasty little laugh. 'But don't worry,' he continued. 'She is quite safe—so far. How much longer she will be safe depends wholly upon you.'"

"Where is she?" I demanded.

"Where you can never get her without my help," he replied.

"If she is anywhere upon all Barsoom, I shall find her," I said.

"She is not on Barsoom. She is on Sasoom."

"You lie, Multis Par," I said.

"He shrugged, indifferently. 'Perhaps you will believe her,' he said, and handed me a letter. It was indeed from Vaja. I recall its message word for word:

"Incredible as it may seem to you, I am a prisoner on Sasoom. Multis Par has promised to bring you here to me if you will perform what he calls a small favor for him. I do not know what he is going to ask of you; but unless it can be honorably done, do not do it. I am safe and unharmed."

"What is it you wish me to do?" I asked.

"I shall not attempt to quote his exact words; but this, in effect, is what he told me: Multis Par's disappearance from Zor was caused by his capture by men from Sasoom. For some time they had been coming to this planet, reconnoitering, having in

mind the eventual conquest of Barsoom.

"I asked him for what reason, and he explained that it was simply because they were a warlike race. Their every thought was of war, as it had been for ages until the warlike spirit was as compelling as the urge for self-preservation. They had conquered all other peoples upon Sasoom and sought a new world to conquer.

"They had captured him to learn what they could of the armaments and military effectiveness of various Barsoomian nations, and had decided that as Helium was the most powerful, it would be Helium upon which they would descend. Helium once disposed of, the rest of Barsoom would, they assumed, be easy to conquer."

"And where do I come in in this scheme of theirs?" I asked.

"I am coming to that," said U Dan. "The Morgors are a thorough-going and efficient people. They neglect no little detail which might effect the success or failure of a campaign. They already have excellent maps of Barsoom and considerable data relative to the fleets and armament of the principal nations. They now wish to check this data and obtain full information as to the war technique of the Heliumites. This they expect to get from you. This they will get from you."

I smiled. "Neither they nor you rate the honor and loyalty of a Heliumite very highly."

A SAD smile crossed his lips. "I know how you feel," he said. "I felt the same way—until they captured Vaja and her life became the price of my acquiescence. Only to save her did I agree to act as a decoy to aid in your capture. The Morgors are adepts in individual and mass psychology as well as in the art of war."

"These things are Morgors?" I asked, nodding in the direction of some of the repulsive creatures. U Dan nodded. "I can appreciate the position in which you have been placed," I said, "but the Morgors have no such hold on me."

"Wait," said U Dan.

"What do you mean?" I demanded.

"Just wait. They will find a way. They are fiends. No one could have convinced me before Multis Par came to me with his proposition that I could have been forced to betray a man whom I, with all decent men, admire as I have admired you, John Carter. Perhaps I was wrong, but when I learned that Vaja would be tortured and mutilated after Multis Par had had his way with her and even then not be allowed to die but kept for future torture, I weakened and

gave in. I do not expect you to forgive, but I hope that you will understand."

"I do understand," I said. "Perhaps, under like circumstances, I should have done the same thing." I could see how terribly the man's conscience tortured him. I could see that he was essentially a man of honor. I could forgive him for the thing that he had done for an innocent creature whom he loved, but could he expect me to betray my country, betray my whole world, to save a woman I had never seen. Still, I was bothered. Frankly, I did not know what I should do when faced with the final decision. "At least," I said, "should I ever be situated as you were, I could appear to comply while secretly working to defeat their ends."

"It was thus that I thought," he said. "It is still the final shred by which I cling to my self-respect. Perhaps, before it is too late, I may still be able to save both Vaja and yourself."

"Perhaps we can work together to that end and to the salvation of Helium," I said; "though I am really not greatly worried about Helium. I think she can take care of herself."

He shook his head. "Not if a part, even, of what Multis Par has told me is true. They will come in thousands of these ships, invisible to the inhabitants of

Barsoom. Perhaps two million of them will invade Helium and overrun her two principal cities before a single inhabitant is aware that a single enemy threatens their security. They will come with lethal weapons of which Barsoomians know nothing and which they cannot, therefore, combat."

"Invisible ships!" I exclaimed. "Why, I saw this one plainly after I was captured."

"Yes," he said. "It was not invisible then, but it was invisible when it came in broad daylight under the bows of your patrol ships and landed in one of the most prominent places in all Lesser Helium. It was not invisible when you first saw it; because it had cast off its invisibility, or, rather, the Morgors had cast it off so that they might find it again themselves, for otherwise it would have been as invisible to them as to us."

"Do you know how they achieve this invisibility?" I asked.

"Multis Par has explained it to me," replied U Dan. "Let me see; I am not much of a scientist, but I think that I recall more or less correctly what he told me. It seems that on some of the ocean beaches on Sasoom there is a submicroscopic, magnetic sand composed of prismatic crystals. When the Morgors desire invisibility for a ship, they magnetize

the hull; and then, from countless tiny apertures in the hull, they coat the whole exterior of the ship with these prismatic crystals. They simply spray them out, and they settle in a cloud upon the hull, causing light rays to bend around the ship. The instant that the hull is demagnetized, these tiny particles, light as air, fall or are blown off; and instantly the ship is visible again."

Here, a Morgor approached and interrupted our conversation. His manner was arrogant and rude. I could not understand his words, as he spoke his own language in the hollow, graveyard tones I had previously noticed. U Dan replied in the same language but in a less lugubrious tone of voice; then he turned to me.

"Your education is to commence at once," he said.

"What do you mean?" I asked.

"During this voyage you are to learn the language of the Morgors," he explained.

"How long is the voyage going to last?" I asked. "It takes about three months to learn a language well enough to understand and make yourself understood."

"The voyage will take about eighteen days, as we shall have to make a detour of some million miles to avoid the Asteroids. They happen to lie directly in our way."

"I am supposed to learn their language in eighteen days?" I asked.

"You are not only supposed to, but you will," replied U Dan.

CHAPTER III

MY education commenced. It was inconceivably brutal, but most effective. My instructors worked on me in relays, scarcely giving me time to eat or sleep. U Dan assisted as interpreter, which was immensely helpful to me, as was the fact that I am exceedingly quick in picking up new languages. Sometimes I was so overcome by lack of sleep that my brain lagged and my responses were slow and inaccurate. Upon one such occasion, the Morgor who was instructing me slapped my face. I had put up with everything else; because I was so very anxious to learn their language—a vital necessity if I were ever to hope to cope with them and thwart their fantastic plan of conquest. But I could not put up with that. I hit the fellow a single blow that sent him entirely across the cabin, but I almost broke my hand against his unpadded, bony jaw.

He did not get up. He lay where he had fallen. Several of his fellows came for me with drawn swords. The situation looked bad, as I was unarmed. U Dan was appalled. Fortunately for me, the

officer in command of the ship had been attracted by the commotion and appeared at the scene of action in time to call his men off. He demanded an explanation.

I had now mastered sufficient words of their language so that I could understand almost everything that was said to me and make myself understood by them, after a fashion. I told the fellow that I had been starved and deprived of sleep and had not complained, but that no man could strike me without suffering the consequences.

"And no creature of a lower order may strike a Morgor without suffering the consequences," he replied.

"What are you going to do about it?" I asked.

"I am going to do nothing about it," he replied. "My orders require me to bring you alive to Eurobus. When I have done that and reported your behavior, it will lie wholly within the discretion of Bandolian as to what your punishment shall be;" then he walked away, but food was brought me and I was allowed to sleep; nor did another Morgor strike me during the remainder of the voyage.

While I was eating, I asked U Dan what Eurobus was. "It is their name for the planet Sassoomb," he replied.

"And who is Bandolian?"

"Well, I suppose he would be

called a jeddak on Barsoom. I judge this from the numerous references I have heard them make concerning him. Anyhow, he seems to be an object of fear if not veneration."

After a long sleep, I was much refreshed. Everything that I had been taught was clear again in my mind, no longer dulled by exhaustion. It was then that the commander took it upon himself to examine me personally. I am quite sure that he did so for the sole purpose of finding fault with me and perhaps punishing me. He was extremely nasty and arrogant. His simplest questions were at first couched in sarcastic language; but finally, evidently disappointed, he left me. I was given no more instruction.

"You have done well," said U Dan. "You have, in a very short time, mastered their language well enough to suit them."

This was the fifteenth day. During the last three days they left me alone. Travelling through space is stupefyingly monotonous. I had scarcely glanced from the portholes for days. This was, however, principally because my time was constantly devoted to instruction; but now, with nothing else to do, I glanced out. A most gorgeous scene presented itself to my astonished eyes. Gorgeous Jupiter loomed before me in all his majestic immensity. Five of his moons were plainly

visible in the heavens. I could even see the tiny one closest to him, which is only thirty miles in diameter. During the ensuing two days, I saw, or at least I thought I saw, all of the remaining five moons. And Jupiter grew larger and more imposing. We were approaching him at the very considerable speed of twenty-three miles per second, but were still some two million miles distant.

FREED from the monotony of language lessons, my mind was once more enslaved to my curiosity. How could life exist upon a planet which one school of scientific thoughts claimed to have a surface temperature of two hundred and sixty degrees below zero and which another school was equally positive was still in half molten condition and so hot that gases rose as hot vapor into its thick, warm atmosphere to fall as incessant rain? How could human life exist in an atmosphere made up largely of ammonia and methane gases? And what of the effect of the planet's terrific gravitational pull? Would my legs be able to support my weight? If I fell down, would I be able to rise again?

Another question, which presented itself to my mind, related to the motive power which had been carrying us through space at terrific speed for seventeen

days. I asked U Dan if he knew.

"They utilize the Eighth Barsoomian Ray, what we know as the ray of propulsion, in combination with the highly concentrated gravitational forces of all celestial bodies within the range of whose attraction the ship passes, and a concentration of Ray L (cosmic rays) which are collected from space and discharged at high velocities from propulsion tubes at the ship's stern. The Eighth Barsoomian Ray helps to give the ship initial velocity upon leaving a planet and as a brake to its terrific speed when approaching its landing upon another. Gravitational forces are utilized both to accelerate speed and to guide the ship. The secret of their success with these inter-planetary ships lies in the ingenious methods they have developed for concentrating these various forces and directing their tremendous energies."

"Thanks, U Dan," I said, "I think I grasp the general idea. It would certainly surprise some of my scientific friends on earth."

My passing reference to scientists started me to thinking of the vast accumulation of theories I was about to see shattered when I landed on Jupiter within the next twenty-four hours. It certainly must be habitable for a race quite similar to our own. These people had lungs, a heart, kidneys, a liver, and other inter-

nal organs similar to our own. I knew this for a fact, as I could see them every time one of the Morgors stood between me and a bright light, so thin and transparent was the parchmentlike skin that stretched tightly over their frames. Once more the scientists would be wrong. I felt sorry for them. They have been wrong so many times and had to eat humble pie. There were those scientists, for instance, who clung to the Ptolemaic System of the universe; and who, after Galileo had discovered four of the moons of Jupiter in 1610, argued that such pretended discoveries were absurd, their argument being that since we have seven openings in the head—two ears, two eyes, two nostrils, and a mouth, there could be in the heavens but seven planets. Having dismissed Galileo's absurd pretensions in this scientific manner, they caused him to be thrown into jail.

When at a distance of about five hundred thousand miles from Jupiter, the ship began to slow down very gradually in preparation for a landing; and some three or four hours later we entered the thick cloud envelope which surrounds the planet. We were barely crawling along now at not more than six hundred miles an hour.

I was all eagerness to see the surface of Jupiter; and extreme-

ly impatient of the time that it took the ship to traverse the envelope, in which we could see absolutely nothing.

AT LAST we broke through, and what a sight was revealed to my astonished eyes! A great world lay below me, illuminated by a weird red light which seemed to emanate from the inner surface of the cloud envelope, shedding a rosy glow over mountain, hill, dale, plain, and ocean. At first I could in no way account for this all pervading illumination; but presently, my eyes roving over the magnificent panorama lying below me, I saw in the distance an enormous volcano, from which giant flames billowed upward thousands of feet into the air. As I was to learn later, the crater of this giant was a full hundred miles in diameter and along the planet's equator there stretched a chain of these Gargantuan torches for some thirty thousand miles, while others were dotted over the entire surface of the globe, giving both light and heat to a world that would have been dark and cold without them.

As we dropped lower, I saw what appeared to be cities, all located at a respectful distance from these craters. In the air, I saw several ships similar to that which had brought me from Mars. Some were very small;

others were much larger than the one with which I had become so familiar. Two small ships approached us, and we slowed down almost to a stop. They were evidently patrol ships. From several ports guns were trained on us. One of the ships lay at a little distance; the other came alongside. Our commander raised a hatch in the upper surface of the ship above the control room and stuck his head out. A door in the side of the patrol ship opened, and an officer appeared. The two exchanged a few words; then the commander of the patrol ship saluted and closed the door in which he had appeared. We were free to proceed. All this had taken place at an altitude of some five thousand feet.

We now spiraled down slowly toward a large city. Later, I learned that it covered an area of about four hundred square miles. It was entirely walled, and the walls and buildings were of a uniform dark brown color, as were the pavements of the avenues. It was a dismal, repellent city built entirely of volcanic rock. Within its boundaries I could see no sign of vegetation—not a patch of sward, not a shrub, not a tree; no color to relieve the monotony of somber brown.

The city was perfectly rectangular, having a long axis of about twenty-five miles and a width of about sixteen. The avenues were

perfectly straight and equidistant, one from the other, cutting the city into innumerable, identical square blocks. The buildings were all perfect rectangles, though not all of either the same size or height—the only break in the depressing monotony of this gloomy city.

Well, not the only break: there were open spaces where there were no buildings—perhaps plazas or parade grounds. But these I did not notice until we had dropped quite low above the city, as they were all paved with the same dark brown rock. The city was quite as depressing in appearance as is Salt Lake City from the air on an overcast February day. The only relief from this insistent sense of gloom was the rosy light which pervaded the scene, the reflection of the flames of the great volcanoes from the inner surface of the cloud envelope; this and the riotous growth of tropical verdure beyond the city's walls—weird, unearthly growths of weird, unearthly hues.

ACCOMPANIED by the two patrol ships, we now dropped gently into a large open space near the center of the city, coming to rest close to a row of hangars in which were many craft similar to our own.

We were immediately surrounded by a detail of warriors;

and, much to my surprise, I saw a number of human beings much like myself in appearance, except that their skins were purple. These were unarmed and quite naked except for G strings, having no harness such as is worn by the Morgors. As soon as we had disembarked, these people ran the ship into the hangar. They were slaves.

There were no interchanges of greetings between the returning Morgors and those who had come out to meet the ship. The two commanding officers saluted one another and exchanged a few routine military brevities. The commander of our ship gave his name, which was Haglion, the name of his ship, and stated that he was returning from Mars—he called it Garobus. Then he detailed ten of his own men to accompany him as guards for U Dan and me. They surrounded us, and we walked from the landing field in the wake of Haglion.

He led us along a broad avenue filled with pedestrian and other traffic. On the sidewalks there were only Morgors. The purple people walked in the gutters. Many Morgors were mounted on enormous, repulsive looking creatures with an infinite number of legs. They reminded me of huge centipedes, their bodies being jointed similarly, each joint being about eighteen inches long. Their heads were equipped with

many long sharp teeth. Like nearly all the land animals of Jupiter, as I was to learn later, they were ungulate, hoofs evidently being rendered necessary by the considerable areas of hardened lava on the surface of the planet, as well as by the bits of lava rock in the soil.

These creatures were sometimes of great length, seating as high as ten or twelve Morgors on their backs. There were other beasts of burden on the avenue. They were of strange, unearthly forms; but I shall not bore you by describing them here.

Above this traffic moved small fliers in both directions. Thus the avenue accommodated a multitude of people, strange, dour people who seldom spoke and, as far as I had seen, never laughed. They might have, as indeed they looked, risen from sad graves to rattle their bones in mock life in a cemetery city of the dead.

U Dan and I walked in the gutter, a guard on the sidewalk close beside each of us. We were not good enough to walk where the Morgors walked! Haglion led us to a large plaza surrounded by buildings of considerable size, but of no beauty. A few of them boasted towers—some squat, some tall, all ugly. They looked as though they had been built to endure throughout the ages.

We were conducted to one of these buildings, before the en-

trance to which a single sentry stood. Haglion spoke to him, and he summoned an officer from the interior of the building, after which we all entered. Our names and a description of each of us were entered in a large book. Haglion was given a receipt for us, after which he and our original escort left.

Our new custodian issued instructions to several warriors who were in the room, and they hustled U Dan and me down a spiral stairway to a dim basement, where we were thrown into a gloomy cell. Our escort locked the door on us and departed.

CHAPTER IV

ALTHOUGH I had often wondered about Jupiter, I had never hoped nor cared to visit it because of the inhospitable conditions which earthly scientists assure us pertain to this great planet. However, here I was, and conditions were not at all as the scientists had described. Unquestionably, the mass of Jupiter is far greater than that of earth or Mars, yet I felt the gravitational pull far less than I had upon earth. It was even less than that which I had experienced upon Mars. This was due, I realized, to the rapid revolution of the planet upon its axis. Centrifugal force tending to throw us off into space, more than outweighed the

increased force of gravitation. I had never before felt so light upon my feet. I was intrigued by contemplation of the height and distances to which I might jump.

The cell in which I found myself, while large, precluded any experiments along that line. It was a large room of hard, brown lava rock. A few white lights set in recesses in the ceiling gave meager illumination. From the center of one wall a little stream of water tinkled into a small cavity in the floor, the overflow being carried off by a gutter through a small hole in the end wall of the cell. There were some grass mats on the floor. These constituted the sole furnishings of the bleak prison.

"The Morgors are thoughtful hosts," I remarked to U Dan. "They furnish water for drinking and bathing. They have installed sewage facilities. They have given us whereon to lie or sit. Our cell is lighted. It is strong. We are secure against the attacks of our enemies. However, as far as the Morgors are concerned, I—"

"S-s-sh!" cautioned U Dan. "We are not alone." He nodded toward the far end of the cell. I looked, and for the first time perceived what appeared to be the figure of a man upon a mat.

Simultaneously, it arose and came toward us. It was, indeed, a man. "You need have no fear of

me," he said. "Say what you please of the Morgors. You could not possibly conceive any terms of opprobrium in which to describe them more virulent than those which I have long used and considered inadequate."

Except that the man's skin was a light blue, I could not see that he differed materially in physical appearance from U Dan and myself. His body, which was almost naked, was quite hairless except for a heavy growth on his head and for eyebrows and eyelashes. He spoke the same language as the Morgors. U Dan and I had been conversing in the universal language of Barsoom. I was surprised that the man had been able to understand us. U Dan and I were both silent for a moment.

"Perhaps," suggested our cell mate, "you do not understand the language of Eurobus—eh?"

"We do," I said, "but we were surprised that you understood our language."

THE fellow laughed. "I did not," he said. "You mentioned the Morgors, so I knew that you were speaking of them; and then, when your companion discovered me, he warned you to silence; so I guessed that you were saying something complimentary about our captors. Tell me—who are you? You are

no Morgors, nor do you look like us Savators."

"We are from Barsoom," I said.

"The Morgors call it Garobus," explained U Dan.

"I have heard of it," said the Savator. "It is a world that lies far above the clouds. The Morgors are going to invade it. I suppose they have captured you either to obtain information from you or to hold you as hostages."

"For both purposes, I imagine," said U Dan. "Why are you imprisoned?"

"I accidentally bumped into a Morgor who was crossing an avenue at an intersection. He struck me and I knocked him down. For that, I shall be destroyed at the graduation exercises of the next class."

"What do you mean by that?" I asked.

"The education of the Morgor youth consists almost wholly of subjects and exercises with the art of war. Because it is spectacular, because it arouses the blood lust of the participants and the spectators, personal combat winds up the exercises upon graduation day. Those of the graduating class who survive are inducted into the warrior caste—the highest caste among the Morgors. Art, literature, and science, except as they may pertain to war, are held in contempt by the Morgors. They have been

kept alive upon Eurobus only through the efforts of us Savators; but, unfortunately, to the neglect of offensive military preparation and training. Being a peace loving people, we armed only for defense." He smiled ruefully and shrugged. "But wars are not won by defensive methods."

"Tell us more about the graduating exercises," said U Dan. "The idea is intriguing. With whom does the graduating class contend?"

"With criminals and slaves," replied the Savator. "Mostly men of my race," he added; "although sometimes there are Morgor criminals of the worst types sentenced to die thus. It is supposed to be the most shameful death that a Morgor can die—fighting shoulder to shoulder with members of a lower order against their own kind."

"Members of a lower order!" I said. "Do the Morgors consider you that?"

"Just a step above the dumb beasts, but accountable for our acts because we are supposed to be able to differentiate between right and wrong—wrong being any word or act or facial expression adversely critical of anything Mogorian or that can be twisted into a subversive act or gesture."

"And suppose you survive the graduating contest?" I asked.

"Are you then set at liberty?"

"In theory, yes," he replied; "but in practice, never."

"You mean they fail to honor terms of their own making?" asked U Dan.

THE Savator laughed. "They are entirely without honor," he said, "yet I do not know that they would not liberate one who survived the combats; because, insofar as I know, no one ever has. You see, the members of the graduating class outnumber their antagonists two to one."

This statement gave me a still lower estimate of the character of the Morgors than I had already inferred from my own observation of them. It is not usual that a warlike people excel in chivalry and a sense of honor; but where all other characteristics are made subservient to brutality, finer humanistic instincts atrophy and disappear.

We sat in silence for some time. It was broken by the Savator. "I do not know your names," he said. "Mine is Zan Dar."

As I told him ours, a detail of Morgor warriors came to our cell and ordered U Dan and me to accompany them. "Good-by!" said Zan Dar. "We probably shall never meet again."

"Shut up, thing!" admonished one of the warriors.

Zan Dar winked at me and laughed. The Morgor was furi-

ous. "Silence, creature" he growled. I thought for a moment that he was going to fall upon Zan Dar with his sword, but he who was in charge of the detail ordered him out of the cell. The incident was but another proof of the egomaniac arrogance of the Morgors. However, it helped to crystalize within me an admiration and liking for the Saviour that had been growing since first he spoke to us.

U Dan and I were led across the plaza to a very large building the entrance to which was heavily guarded. The hideous, grinning, skull-like heads of the warriors and their skeletal limbs and bodies, together with the dark and cavernous entrance to the building suggested a grisly fantasia of hell's entrance guarded by the rotting dead. It was not a pleasant thought.

We were held here for quite some time, during which some of the warriors discussed us as one might discuss a couple of stray alley cats. "They are like the Savators and yet unlike them," said one.

"They are quite as hideous," said another.

"One of them is much darker than the other."

Now, for the first time, I was struck by the color of these Morgors. Instead of being ivory color, they were a pink or rosy shade. I looked at U Dan. He was

a very dark red. A glance at my arms and hands showed that they, too, were dark red; but not as dark a red as U Dan. At first I was puzzled; then I realized that the reflection of the red glare of the volcanoes from the inner surface of the cloud envelope turned our reddish skins a darker red and made the yellow, parchmentlike skins of the Morgors appear pink. As I looked around, I realized that this same reddish hue appeared upon everything within sight. It reminded me of a verse in a popular song I heard some time ago on one of my visits to earth. It went, I think: "I am looking at the world through rose colored glasses, and everything is rosy now." Well, everything wasn't rosy with me, no matter how rosy this world looked.

Presently an officer came to the entrance and ordered our escort to bring us in. The interior of the building was as unlovely as its exterior. Although this was, as I later learned, the principal palace of the Morgor ruler, there was absolutely no sign of ornamentation. No art relieved the austerity of gloomy, lava-brown corridors and bare, rectangular chambers. No hangings softened the sharp edges of openings; no rugs hid even a part of the bare, brown floors. The pictureless walls frowned down upon us. I have seldom been in a more de-

pressing environment. Even the pits beneath the deserted cities of Barsoom often had interesting vaulted ceilings, arched doorways, elaborate old iron grill work, attesting the artistic temperaments of their designers. The Morgors, like death, were without art.

WE WERE led to a large, bare chamber in which a number of Morgors were clustered about a desk at which another of the creatures was seated. All Morgors look very much alike to me, yet they do have individual facial and physical characteristics; so I was able to recognize Haglion among those standing about the desk. It was Haglion who had commanded the ship that had brought me from Mars.

U Dan and I were halted at some distance from the group, and as we stood here two other red Martians were brought into the room—a man and a girl. The girl was very beautiful.

"Vaja!" exclaimed U Dan, but I did not need this evidence to know who she was. It was equally certain that the man was Multis Par, Prince of Zor. He appeared nervous and downcast, but even so the natural arrogance of the man was indelibly stamped upon his features.

At U Dan's exclamation, one of those guarding us whispered, "Silence, thing!" Vaja's eyes

went wide in incredulity as she recognized my companion; and she took an impulsive step toward him, but a warrior seized her arm and restrained her. The faint shadow of a malicious smile touched the thin lips of Multis Par.

The man seated at the desk issued an order, and all four of us were brought forward and lined up in front of him. The fellow differed in appearance not at all from other Morgors. He wore no ornaments. His harness and weapons were quite plain but evidently servicable. They were marked with a hieroglyph that differed from similar markings on the harness and weapons of the other Morgors, as those of each of the others differed from all the rest. I did not know then what they signified; but later learned that each hieroglyph indicated the name, rank, and title of him who wore it. The hieroglyph of the man at the desk was that of Bandolian, Emperor of the Morgors.

Spread upon the desk before Bandolian was a large map, which I instantly recognized as that of Barsoom. The man and his staff had evidently been studying it. As U Dan and I were halted before his desk with Vaja and Multis Par, Bandolian looked up at the Prince of Zor.

"Which is he," he asked, "who is called Warlord of Barsoom?"

Multis Par indicated me, and Bandolian turned his hollow eyes upon me. It was as though Death had looked upon me and singled me out as his own. "I understand that your name is John Carter," he said. I nodded in affirmation. "While you are of a lower order," he continued, "yet it must be that you are endowed with intelligence of a sort. It is to this intelligence that I address my commands. I intend to invade and conquer Barsoom (he called it Garobus), and I command you to give me all the assistance in your power by acquainting me and my staff with such military information as you may possess relative to the principal powers of Garobus, especially that one known as the Empire of Helium. In return for this your life will be spared."

I looked at him for a moment, and then I laughed in his face. The faintest suggestion of a flush overspread the pallor of his face. "You dare laugh at me, thing!" he growled.

"It is my answer to your proposition," I said.

Bandolian was furious. "Take it away and destroy it!" he ordered.

"Wait, Great Bandolian!" urged Multis Par. "His knowledge is almost indispensable to you, and I have a plan whereby you may make use of it."

"What is it?" he demanded.

"He has a mate whom he worships. Seize her and he will pay any price to protect her from harm."

"Not the price the Morgor has asked," I said to Multis Par, "and if she is brought here it will be the seal upon your death warrant."

"Enough of this," snapped Bandolian. "Take them all away."

"Shall I destroy the one called John Carter?" asked the officer who commanded the detail that had brought us to the chamber.

"Not immediately."

"He struck a Morgor," said Haglion; "one of my officers."

"He shall die for that, too," said Bandolian.

"That will be twice," I said.

"Take it away!" snapped Bandolian.

As we were led away, Vaja and U Dan gazed longingly at one another.

CHAPTER V

ZAN DAR, the Savator, was surprised to see us return to the cell in so short a time. "In fact," he said, "I did not expect ever to see you again. How did it happen?"

I explained briefly what had occurred in the audience chamber, adding, "I have been returned to the cell to await death."

"And you, U Dan?" he asked.

"I don't know why they both-

ered to take me up there," replied U Dan. "Bandolian paid no attention to me whatever."

"He had a reason, you may rest assured. He is probably trying to break down your morale by letting you see the girl you love, in the belief that you will influence John Carter to accede to his demands. John Carter lives only because Bandalian hopes to eventually break down his resistance."

Time dragged heavily in that cell beneath the Morgor city. There was no means for determining the passage of time. For that matter, there would have been none had we been above ground, for there are no nights upon Jupiter. It is always day. The sun, four hundred eighty-three million miles away, would shed but little light upon the planet even were it exposed to the full light of the star that is the center of our solar system; but that little light is obscured by the dense cloud envelope which surrounds this distant world. What little filters through is negated by the gigantic volcanic torches which bathe the entire planet in perpetual daylight. Although Jupiter rotates upon its axis in less than ten hours, its day is for eternity.

U Dan and I learned much concerning conditions on the planet from Zan Dar. He told us

of the vast warm seas which seethed in constant tidal agitation resulting from the constantly changing positions of the four larger moons which revolve about Jupiter in forty-two hours, eighty-five hours, one hundred seventy-two hours, and four hundred hours respectively while the planet spins upon its axis, making a complete revolution in nine hours and fifty-five minutes. He told us of vast continents and enormous islands; and I could well imagine that such existed, as a rough estimate indicated that the area of the planet exceeded twenty-three billion square miles.

As the axis of Jupiter is nearly perpendicular to the plane of its motion, having an inclination of only about 3° , there could be no great variety of seasons; so over this enormous area there existed an equable climate, warm and humid, perpetually lighted and heated by the innumerable volcanoes which pit the surface of the planet. And here was I, an adventurer who had explored two worlds, cooped up in a subterranean cell upon the most amazing and wonderful planet of our entire solar system! It was maddening.

ZAN DAR told us that the continent upon which we were was the largest. It was the ancestral home of the Morgor Gov-

ernor-General, paid tribute to the Morgors in manufactured goods, foodstuffs, and slaves. There were still a few areas, small and considered of little value by the Morgors, which retained their liberty and their own governments. From such an area came Zan Dar—a remote island called Zantor.

"It is a land of tremendous mountains, thickly forested with trees of great size and height," he said. "Because of our mountains and our forests, it is an easy land to defend against an air borne enemy."

When he told me the height of some of the lofty peaks of Zantor, it was with difficulty that I could believe him: to a height of twenty miles above sea level rose the majestic king of Zantor's mountains.

"The Morgors have sent many an expedition against us," said Zan Dar. "They get a foothold in some little valley; and there, above them and surrounding them in mountain fastnesses that are familiar to us and unknown to them, we have had them at our mercy, picking them off literally one by one until they are so reduced in numbers that they dare remain no longer. They kill many of us, too; and they take prisoners. I was taken thus in one of their invasions. If they brought enough ships and enough men, I suppose they could conquer us;

but our land is scarcely worth the effort, and I think they prefer to leave us as we are to give their recruits practice in actual warfare."

I don't know how long we had been confined when Multis Par was brought to our cell by an officer and a detachment of warriors. He came to exhort me to co-operate with Bandolian.

"The invasion and conquest of Barsoom are inevitable," he said. "By assisting Bandolian you can mitigate the horror of it for the inhabitants of Barsoom. You will thus be serving our world far better than by stupidity and stubbornly refusing to meet Bandolian half way."

"You are wasting your time," I said.

"But our own lives depend upon it," he cried. "You and U Dan, Vaja and I shall die if you refuse. Bandolian's patience is almost worn out now." He looked pleadingly at U Dan.

"We could not die in a better cause," said U Dan, much to my surprise. "I shall be glad to die in atonement for the wrong that I did John Carter."

"You are two fools!" exclaimed Multis Par, angrily.

"At least we are not traitors," I reminded him.

"You will die, John Carter," he growled, "but before you die, you shall see your mate in the clutches of Bandolian. She has been

sent for. Now, if you change your mind, send word by one of those who bring your meals."

I sprang forward and knocked the creature down. I should have killed him then had not the Morgors dragged him from the cell.

SO THEY had sent for Dejah Thoris—and I was helpless. They would get her. I knew how they would get her—by assuring her that only through her cooperation could my immediate death be averted. I wondered if they would win. Would I, in the final test, sacrifice my beloved princess or my adopted country? Frankly, I did not know; but I had the example of U Dan to guide me. He had placed patriotism above love. Would I?

Time dragged on in this gloomy cell where there was no time. We three plotted innumerable futile plans of escape. We improvised games to help mitigate the monotony of our dull existence. More profitably, however, U Dan and I learned much from Zan Dar concerning this great planet. And Zan Dar learned much of what lay beyond the eternal cloud envelope which hides from the view of the inhabitants of Jupiter the sun, the other planets, the stars, and even their own moons. All that Zan Dar knew of them was the little he had been able to glean from remarks dropped by Morgors of

what had been seen from their interplanetary ships. Their knowledge of astronomy was only slightly less than their interest in the subject, which was practically non-existent. War, conquest, and bloodshed were their sole interests in life.

At last there came a break in the deadly monotony of our lives: a new prisoner was thrown into the cell with us. And he was a Morgor! The situation was embarrassing. Had our numbers been reversed, had there been three Morgors and one of us, there would have been no doubt as to the treatment that one would have received. He would have been ostracized, imposed upon, and very possibly abused. The Morgor expected this fate. He went into a far corner of the cell and awaited what he had every reason to expect. U Dan, Zan Dar, and I discussed the situation in whispers. That must have been a trying time for the Morgor. We three finally decided to treat the creature simply as a fellow prisoner until such time as his own conduct should be our eventual guide. Zan Dar was the first to break the ice. In a friendly manner he asked what mischance had brought the fellow to this pass.

"I killed one who had an influential relative in the palace of Bandolian," he replied, and as he spoke he came over closer to us.

"For that I shall die, probably in the graduating exercises of the next class. We shall doubtless all die together," he added with a hollow laugh. He paused. "Unless we escape," he concluded.

"Then we shall die," said Zan Dar.

"Perhaps," said the Morgor.

"One does not escape from the prisons of the Morgors," said Zan Dar.

I was interested in that one word "perhaps." It seemed to me fraught with intentional meaning. I determined to cultivate this animated skeleton. It could do no harm and might lead to good. I told him my name and the names of my companions; then I asked his.

"Vorion," he replied, "but I need no introduction to you, John Carter. We have met before. Don't you recognize me?" I had to admit that I did not. Vorion laughed. "I slapped your face and you knocked me across the ship. It was a noble blow. For a long time they thought I was dead."

"Oh," I said, "you were one of my instructors. It may please you to know that I am going to die for that blow."

"Perhaps not," said Vorion. There was that "perhaps" again.

MUCH to our surprise, Vorion proved not at all a bad companion. Toward Bandolian and

the powerful forces that had condemned him to death and thrown him into prison he was extremely bitter. I learned from him that the apparent veneration and loyalty accorded Bandolian by his people was wholly a matter of disciplined regimentation. At heart, Vorion loathed the man as a monster of cruelty and tyranny. "Fear and generations of training hold our apparent loyalty," he said.

After he had been with us for some time, he said to me, "You three have been very decent to me. You could have made my life miserable here; and I could not have blamed you had you done so, for you must hate us Morgors."

"We are all in the same boat," I said. "We could gain nothing by fighting among ourselves. If we work together—perhaps—" I used his own perhaps.

Vorion nodded. "I have been thinking that we might work together," he said.

"To what end?" I asked.

"Escape."

"Is that possible?"

"Perhaps."

U Dan and Zan Dar were eager listeners. Vorion turned to the latter. "If we should escape," he said, "You three have a country to which you might go with every assurance of finding asylum, while I could expect only death in any country upon the face of

the Eurobus. If you could promise me safety in your country—" He paused, evidently awaiting Zar Dar's reaction.

"I could only promise to do my best for you," said Zan Dar; "but I am confident that if you were the means of my liberation and return to Zanor, you would be permitted to remain there in safety."

Our plotting was interrupted by the arrival of a detail of warriors. The officer in command singled me out and ordered me from the cell. If I were to be separated from my companions, I saw the fabric of my dream of escape dissolve before my eyes.

They led me from the building and across the plaza to the palace of Bandolian, and after some delay I found myself again in the audience chamber. From behind his desk, the hollow eyes of the tyrant stared at me from their grinning skull. "I am giving you your last chance," said Bandolian, then he turned to one of his officers. "Bring in the other," he said. There was a short wait, and then a door at my right opened and a guard of warriors brought in the "other." It was Dejah Thoris! My incomparable Dejah Thoris!

WHAT a lovely creature she was as she crossed the floor surrounded by hideous Morgors. What majestic dignity, what

fearlessness distinguished her carriage and her mien! That such as she should be sacrificed even for a world! They halted her scarce two paces from me. She gave me a brave smile, and whispered, "Courage! I know now why I am here. Do not weaken. Better death than dishonor."

"What is she saying?" demanded Bandolian.

I thought quickly. I knew that the chances were that not one of them there understood the language of Barsoom. In their stupid arrogance they would not deign to master the tongue of a lower order.

"She but pleads with me to save her," I said. I saw Dejah Thoris smile. Evidently they had taught her the language of the Morgors on the long voyage from Mars.

"And you will be wise to do so," said Bandolian, "Otherwise she will be given to Multis Par and afterward tortured and mutilated many times before she is permitted to die."

I shuddered in contemplation of such a fate for my princess, and in that moment I weakened once again. "If I aid you, will she be returned unharmed to Helium?" I asked.

"Both of you will—after I have conquered Garobus," replied Bandolian.

"No! No!" whispered Dejah Thoris. "I should rather die than

return to Helium with a traitor. No, John Carter, you could never be that even to save my life."

"But the torture! The mutilation! I would be a traitor a thousand time over to save you from that, and I can promise you that no odium would be attached to you: I should never return to Barsoom."

"I shall be neither tortured nor mutilated," she said. "Sewn into my harness is a long, thin blade."

I understood and I was relieved. "Very well," I said. "If we are to die for Barsoom, it is no more than thousands of her brave warriors have done in the past; but we are not dead yet. Remember that, my princess; and do not use that long, thin blade upon yourself until hope is absolutely dead."

"While you live, hope will live," she said.

"Come! Come!" said Bandalian. "I have listened long enough to your silly jabbering. Do you accept my proposition?"

"I am considering it," I said, "but I must have a few more words with my mate."

"Let them be few," snapped the Morgor.

I turned to Dejah Thoris. "Where are you imprisoned?" I asked.

"On the top floor of a tower at the rear of this building at the corner nearest the great volcano.

There is another Barsoomian with me—a girl from Zor. Her name is Vaja."

Bandalian was becoming impatient. He drummed nervously on his desk with his knuckles and snapped his grinning jaws together like castanets. "Enough of this!" he growled. "What is your decision?"

"The matter is one of vast importance to me," I replied. "I cannot decide it in a moment. Return me to my cell so that I may think it over and discuss it with U Dan, who also has much at stake."

"Take it back to its cell," ordered Bandalian; and then, to me: "You shall have time, but not much. My patience is exhausted."

CHAPTER VI

I HAD no plan. I was practically without hope, yet I had gained at least a brief reprieve for Dejah Thoris. Perhaps a means of escape might offer itself. Upon such unsubstantial fare I fed the shred of hope to which I clung.

My cellmates were both surprised and relieved when I was returned to them. I told them briefly of what had occurred in the audience chamber of Bandalian. U Dan showed real grief when he learned that Dejah Thoris was in the clutches of the Morgors, and cursed himself for the part he had taken in bring-

ing her and me to a situation in which we faced the alternatives of death or dishonor.

"Vain regrets never got anyone anywhere," I said. "They won't get us out of this cell. They won't get Dejah Thoris and Vaja out of Bandolian's tower. Forget them. We have other things to think about." I turned to Vorion. "You have spoken of the possibility of escape. Explain yourself."

He was not accustomed to being spoken to thus peremptorily by one of the lower orders, as the Morgors considered us; but he laughed, taking it in good part. The Morgors cannot smile. From birth to death they wear their death's head grin—frozen, unchangeable.

"There is just a chance," he said. "It is just barely a chance. Slender would be an optimistic description of it, but if it fails we shall be no worse off than we are now."

"Tell us what it is," I said.

"I can pick the lock of our cell door," he explained. "If luck is with us, we can escape from this building. I know a way that is little used, for I was for long one of the prison guard."

"What chance would we have once we were in the streets of the city?" demanded U Dan. "We three, at least, would be picked up immediately."

"Not necessarily," said Vor-

ion. "There are many slaves on the avenues who look exactly like Zan Dar. Of course, the color of the skin of you men from Garobus might attract attention; but that is a chance we shall have to take."

"And after we are in the streets?" asked Zan Dar. "What then?"

"I shall pretend that I am in charge of you. I shall treat you as slaves are so often treated that it will arouse no comment nor attract any undue attention. I shall have to be rough with you, but you will understand. I shall herd you to a field where there are many ships. There I shall tell the guard that I have orders to bring you to clean a certain ship. In this field are only the private ships of the rich and powerful among us, and I well know a certain ship that belongs to one who seldom uses it. If we can reach this ship and board it, nothing can prevent us from escaping. In an hour from now, we shall be on our way to Zanor—if all goes well."

"And if we can take Vaja and Dejah Thors with us," I added.

"I had forgotten them," said Vorion. "You would risk your lives for two females?"

"Certainly," said U Dan.

VORION shrugged. "You are strange creatures," he said. "We Morgors would not risk a

little finger for a score of them. The only reason that we tolerate them at all is that they are needed to replenish the supply of warriors. To attempt to rescue two of yours may easily end in disaster for us all."

"However, we shall make the attempt," I said. "Are you with us, Zan Dar?" I asked the Sava-tor.

"To the end," he said, "whatever it may be."

Again Vorion shrugged. "As you will," he said, but not with much enthusiasm; then he set to work on the lock, and in a very short time the door swung open and we stepped out into the corridor. Vorion closed the door and relocked it. "This is going to give them food for speculation," he remarked.

He led us along the corridor in the opposite direction from that in which we had been brought to it and from which all those had come who had approached our cell since our incarceration. The corridor became dark and dusty the farther we traversed it. Evidently it was little used. At its very end was a door, the lock to which Vorion quickly picked; and a moment later we stepped out into a narrow alleyway.

So simple had been our escape up to now that I immediately apprehended the worst: such luck could not last. Even the alley which we had entered was de-

serted: no one had seen us emerge from the prison. But when we reached the end of the alley and turned into a broad avenue, the situation was very different. Here were many people—Morgors upon the sidewalks, slaves in the gutters, strange beasts of burden carrying their loads of passengers upon the pavement.

Now, Vorion began to berate and cuff us as we walked in the gutter and he upon the sidewalk. He directed us away from the central plaza and finally into less frequented avenues, yet we still passed too many Morgors to suit me. At any minute one of them might notice the unusual coloration of U Dan's skin and mine. I glanced at Zan Dor to note if the difference between his coloration and ours was at all startling, and I got a shock. Zan Dar's skin had been blue. Now it was pruple! It took me a moment to realize that the change was due to the rosy light of the volcano's flames turning Zan Dar's natural blue to purple.

We had covered quite a little distance in safety, when a Morgor, passing, eyed us suspiciously. He let us go by him; then he wheeled and called to Vorion. "Who are those two?" he demanded. "They are not Savators."

"They have been ill," said Vorion, "and their color has

changed." I was surprised that the fellow could think so quickly.

"Well, who are you?" asked the fellow, "and what are you doing in charge of slaves while unarmed?"

Vorion looked down at his sides in simulated surprise. "Why, I must have forgotten them," he said.

"I think that you are lying to me," said the fellow. "Come along with me, all of you."

HERE seemed an end of our hopes of escape. I glanced up and down the street. It appeared to be a quiet, residential avenue. There was no one near us. Several small ships rested at the curb in front of dreary, brown domiciles. That was all. No eyes were upon us. I stepped close to the fellow who had thus rashly presented himself as an obstacle in the way of Dejah Thoris' rescue. I struck him once. I struck him with all my strength. He dropped like a log.

"You have killed him," exclaimed Vorion. "He was one of Bandolian's most trusted officers. If we are caught now, we shall be tortured to death."

"We need not be caught," I said. "Let's take one of these ships standing at the curb. Why take the time and the risk to go farther?"

Vorion shook his head. "They wouldn't do," he said. "They are

only for intramural use. They are low altitude ships that would never get over even a relatively small mountain range; but more important still, they cannot be rendered invisible. We shall have to go on to the field as we have planned."

"To avoid another such encounter as we have just experienced," I said, "we had better take one of these ships at least to the vicinity of the field."

"We shall be no worse off adding theft to murder," said Zan Dar.

Vorion agreed, and a moment later we were all in a small ship and sailing along a few yards above the avenue. Keenly interested, I carefully noted everything that Vorion did in starting the motor and controlling the craft. It was necessary for me to ask only a few questions in order to have an excellent grasp of the handling of the little ship, so familiar was I with the air ships of two other worlds. Perhaps I should never have the opportunity to operate one of these, but it could do no harm to know how.

We quitted the flier a short distance from the field and continued on foot. As Vorion had predicted, a guard halted us and questioned him. For a moment everything hung in the balance. The guard appeared skeptical, and the reason for his skepticism was largely that which had

motivated the officer I had killed to question the regularity of Vorion's asserted mission—the fact that Vorion was unarmed. The guard told us to wait while he summoned an officer. That would have been fatal. I felt that I might have to kill this man, too; but I did not see how I could do it without being observed, as there were many Morgors upon the field, though none in our immediate vicinity.

Vorion saved the day. "Come! Come!" he exclaimed in a tone of exasperation. "I can't wait here all day while you send for an officer. I am in a hurry. Let me take these slaves on and start them to work. The officer can come to the ship and question me as well as he can question me here."

THE guard agreed that there was something in this; and, after ascertaining the name and location of the ship which we were supposed to clean, he permitted us to proceed. I breathed an inward sigh of relief. After we had left him, Vorion said that he had given him the name and location of a different ship than that which we were planning to steal. Vorion was no fool.

The ship that Vorion had selected was a slim craft which appeared to have been designed for speed. We lost no time boarding her; and once again I

watched every move that Vorion made, questioning him concerning everything that was not entirely clear to me. Although I had spent some eighteen days aboard one of these Morgorian ships. I had learned nothing relative to their control, as I had never been allowed in the control room nor permitted to ask questions.

First, Vorion magnetized the hull and sprayed it with the fine sands of invisibility; then he started the motor and nosed up gently. I had explained my plan to him, and once he had gained a little altitude he headed for the palace of Bandolain. Through a tiny lens set in the bow of the ship the view ahead was reflected upon a ground glass plate, just as an image is projected upon the finder of a camera. There were several of these lenses, and through one of them I presently saw the square tower at the rear of the palace, the tower in which Dejah Thoris and Vaja were confined.

"When I bring the ship up to the window," said Vorion, "you will have to work fast, as the moment that we open the door in the ship's hull, part of the interior of the ship will be visible. Someone in the palace or upon the ground may notice it, and instantly we shall be surrounded by guard and patrol ships."

"I shall work fast," I said.

I must admit that I was more

excited than usual as Vorion brought the craft alongside the tower window, which we had seen was wide open and unbarred. U Dan and Zan Dar stood by to open the door so that I could leap through the window and then to close it immediately after I had come aboard with the two girls. I could no longer see the window now that the craft was broadside to it; but at a word from Vorion, U Dan and Zan Dar slid the door back. The open window was before me, and I leaped through it into the interior of the tower room.

Fortunately for me, fortunately for Dejah Thoris, and fortunately for Vaja, it was the right room. The two girls were there, but they were not alone. A man held Dejah Thoris in his arms, his lips searching for hers. Vaja was striking him futilely on the back, and Dejah Thoris was trying to push his face from hers.

I seized the man by the neck and hurled him across the room; then I pointed to the window and the ship beyond and told the girls to get aboard as fast as they could. They needed no second invitation. As they ran across the room toward the window, the man rose and faced me. It was Multis Par! Recognizing me, he went almost white; then he whipped out his sword and simultaneously commenced to shout for the guard.

Seeing that I was unarmed, he came for me. I could not turn and run for the window: had I, he could have run me through long before I could have reached it; so I did the next best thing. I charged straight for him. This apparently suicidal act of mine evidently confused him, for he fell back. But when I was close to him, he lunged for me. I parried the thrust with my forearm. I was inside his point now, and an instant later my fingers closed upon his throat. Like a fool, he dropped his sword then and attempted to claw my fingers loose with his two hands. He could have shortened his hold on it and run me through the heart, but I had to take that chance.

I WOULD have finished him off in a moment had not the door of the room been thrown open to admit a dozen Morgor warriors. I was stunned! After everything had worked so well, to have this happen! Were all our plans to be thus thwarted? No, not all.

I shouted to U Dan: "Close the door and take off! It is a command!"

U Dan hesitated. Dejah Thoris stood at his side with one hand outstretched toward me and an indescribable expression of anguish on her face. She took a step forward as though to leap from the ship back into the room. U Dan quickly barred her way, and

then the ship started to move away. Slowly the door slid closed, and once again the craft was entirely invisible.

All this transpired in but a few seconds while I still clung to Multis Par's throat. His tongue protruded and his eyes stared glassily. In a moment more he would have been dead; then the Morgor warriors were upon me, and I was dragged from my prey.

My captors handled me rather roughly and, perhaps, not without reason, for I had knocked three of them unconscious before they overpowered me. Had I but had a sword! What I should have done to them then! But though I was battered and bruised as they hustled me down from the tower, I was smiling; for I was happy. Dejah Thoris had been snatched from the clutches of the skeleton men and was, temporarily at least, safe. I had good cause for rejoicing.

I was taken to a small, unlighted cell beneath the tower; and here I was manacled and chained to the wall. A heavy door was slammed shut as my captors left me, and I heard a key turn in a massive lock.

Alone, in utter darkness, I awaited my fate.

CHAPTER VII

IN SOLITARY confinement unrelieved by even a suggestion of light, one is thrown entirely

upon the resources of one's thoughts for mitigation of absolute boredom—such boredom as sometimes leads to insanity for those of weak wills and feeble nerves. But my thoughts were pleasant thoughts. I envisaged Dejah Thoris safely bound for a friendly country in an invisible ship which would be safe from capture, and I felt that three of those who accompanied her would be definitely friendly and that one of them, U Dan, might be expected to lay down his life to protect her were that ever necessary. As to Vorion, I could not even guess what his attitude toward her would be.

My own situation gave me little concern. I will admit that it looked rather hopeless, but I had been in tight places before and yet managed to survive and escape. I still lived, and while life is in me I never give up hope. I am a confirmed optimist, which, I think, gives me an attitude of mind that more often than not commands what we commonly term the breaks of life.

Fortunately, I was not long confined in that dark cell. I slept once, for how long I do not know; and I was very hungry when a detail of warriors came to take me away; hungry and thirsty, for they had given me neither food nor water while I had been confined.

I was not taken before Bando-

lian this time, but to one of his officers—a huge skeleton that continually opened and closed its jaws with a snapping and grinding sound. The creature was Death incarnate. From the way he questioned me, I concluded that he must be the lord high inquisitor. In silence, he eyed me from those seemingly hollow sockets for a full minute before he spoke; then he bellowed at me.

"Thing," he shouted, "for even a small part of what you have done you deserve death—death after torture."

"You don't have to shout at me," I said; "I'm not deaf."

That enraged him, and he pounded upon his desk. "For impudence and disrespect it will go harder with you."

"I cannot show respect when I do not feel respect," I told him. "I respect only those who command my respect. I surely could not respect a bag of bones with an evil disposition."

I do not know why I deliberately tried to infuriate him. Perhaps it is just a weakness of mine to enjoy baiting enemies whom I think contemptible. It is, I admit, a habit fraught with danger; and, perhaps, a stupid habit; but I have found that it sometimes so disconcerts an enemy as to give me a certain advantage. In this instance I was at least successful in part: the

creature was so furious that for some time it remained speechless; then it leaped to its feet with drawn sword.

MY SITUATION was far from enviable. I was unarmed, and the creature facing me was in an uncontrollable rage. In addition to all this, there were four or five other Morgors in the room, two of whom were holding my arms—one on either side. I was as helpless as a sheep in an abattoir. But as my would-be executioner came around the end of his desk to spit me on his blade, another Morgor entered the room.

The newcomer took in the situation at a glance, and shouted, "Stop, Gorgum!" The thing coming for me hesitated; then he dropped his point.

"The creature deserves death," Gorgum said, sullenly. "It defied and insulted me—me, an officer of the Great Bandolian!"

"Vengeance belongs to Bandolian," said the other, "and he has different plans for this insolent worm. What has your questioning developed?"

"He has been so busy screaming at me that he has had no time to question me," I said.

"Silence, low one!" snapped the newcomer. "I can well understand," he said to Gorgum, "that your patience must have been sorely tried; but we must respect

the wishes of the Grac Bandollian. Proceed with the investigation."

Gorgum returned his sword to its scabbard and reseated himself at his desk. "What is your name?" he demanded.

"John Carter, Prince of Helium," I replied. A scribe at Gorgum's side scribbled in a large book. I supposed that he was recording the question and the answer. He kept this up during the entire interview.

"How did you and the other conspirators escape from the cell in which you were confined?" Gorgum asked.

"Through the doorway," I replied.

"That is impossible. The door was locked when you were placed in the cell. It was locked at the time your absence was discovered."

"If you know so much, why bother to question me?"

Gorgum's jaws snapped and ground more viciously than ever. "You see, Horur," he said angrily, turning to the other officer, "the insolence of the creature."

"Answer the noble Gorgum's question," Horur snapped at me. "How did you pass through a locked door?"

"It was not locked."

"It *was* locked," shouted Gorgum.

I shrugged. "What is the use?" I asked. "It is a waste of time to answer the questions of

one who knows more about the subject than I, notwithstanding the fact that he was not there."

"Tell me, then, in your own words how you escaped from the cell," said Horur in a less irritating tone of voice.

"We picked the lock."

"That would have been impossible," bellowed Gorgum.

"Then we are still in the cell," I said. "Perhaps you had better go and look."

"We are getting nowhere," snapped Horur.

"Rapidly," I agreed.

"I shall question the prisoner," said Horur. "We concede that you did escape from the cell."

"Rather shrewd of you."

HE IGNORED the comment. "I cannot see that the means you adopted are of great importance. What we really wish to know is where your accomplices and the two female prisoners are now. Multis Par says that they escaped in a ship—probably one of our own which was stolen from a flying field."

"I do not know where they are."

"Do you know where they planned to go?"

"If I did, I would not tell you."

"I command you to answer me, on pain of death."

I laughed at the creature. "You intend to kill me anyway;

so your threat finds me indifferent."

Horur kept his temper much better than had Gorgum, but I could see that he was annoyed. "You could preserve your life if you were more co-operative," he said. "Great Bandolian asks but little of you. Tell us where your accomplices intended going and promise to aid Great Bandolian in his conquest of Helium, and your life will be spared."

"No," I said.

"Wait," urged Horur. "Bandolian will go even further. Following our conquest of Helium, he will permit you and your mate to return to that country and he will give you a high office in the new government he intends to establish there. If you refuse, you shall be destroyed; your mate will be hunted down and, I promise you, she will be found. Her fate will be infinitely worse than death. You had better think it over."

"I do not need to think over such a proposition. I can give you a final answer on both counts—my irrevocable answer. It is—never!"

If Horur had had a lip, he would doubtless have bitten it. He looked at me for a long minute; then he said, "Fool!" after which he turned to Gorgum. "Have it placed with those who are being held for the next class;" then he left the room.

I was now taken to a building located at some distance from those in which I had previously been incarcerated, and placed in a large cell with some twenty other prisoners, all of whom were Savators.

"What have we here?" demanded one of my fellow prisoners after my escort had left and locked the door. "A man with a red skin! He is no Savator. What are you, fellow?"

I DID not like the looks of him, nor his tone of voice. I was not seeking trouble with those with whom I was to be imprisoned and with whom I was probably destined to die; so I walked away from the fellow and sat down on a bench in another part of the chamber, which was quite large. But the fool followed me and stood in front of me in a truculent attitude.

"I asked you what you were," he said, threateningly; "and when Pho Lar asks you a question, see that you answer it—and quickly. I am top man here." He looked around at the others. "That's right, isn't it?" he demanded of them.

There were some sullen, affirmative grunts. I could see at once that the fellow was unpopular. He appeared a man of considerable muscular development; and his reception of me, a newcomer among them, testified to the fact

that he was a bully. It was evident that he had the other prisoners cowed.

"You seem to be looking for trouble, Lo Phar," I said; "but I am not. I am already in enough trouble."

"My name is Pho Lar, fellow," he barked.

"What difference does it make? You would stink by any name." The other prisoners immediately took interested notice. Some of them grinned.

"I see that I shall have to put you in your place," said Pho Lar, advancing toward me angrily.

"I do not want any trouble with you," I said. "It is bad enough to be imprisoned, without quarrelling with fellow prisoners."

"You are evidently a coward," said Pho Lar; "so, if you will get down on your knees and ask my pardon, I shall not harm you."

I had to laugh at that, which made the fellow furious; yet he hesitated to attack me. I realized then that he was a typical bully—yellow at heart. However, to save his face, he would probably attack me if he could not bluff me. "Don't make me angry," he said. "When I am angry I do not know my own strength. I might kill you."

"I wonder if this would make you angry," I said, and slapped him across the cheek with my open palm. I slapped him so hard

that he nearly fell down. I could have slapped him harder. This staggered him more than physically. The blood rushed to his blue face until it turned purple. He was in a spot. He had started something; and if he were to hold his self-appointed position as top man, as he had described himself, he would have to finish it. The other prisoners had now all arisen and formed a half circle about us. They looked alternately at Pho Lar and at me in eager anticipation.

PHO LAR had to do something about that slap in the face. He rushed at me and struck out clumsily. As I ward off his blows, I realized that he was a very powerful man; but he lacked science, and I was sure that he lacked guts. I determined to teach him a lesson that he would not soon forget. I could have landed a blow in the first few seconds of our encounter that would have put him to sleep, but I preferred to play with him.

I countered merely with another slap in the face. He came back with a haymaker that I ducked; then I slapped him again—a little harder this time.

"Good work!" exclaimed one of the prisoners.

"Go to it, red man!" cried another.

"Kill him!" shouted a third.

Pho Lar tried to clinch, but I

caught one of his wrists, wheeled around, bent over, and threw him over my shoulder. He lit heavily on the lava flooring. He lay there for a moment, and as he scrambled to his feet I put a headlock on him and threw him again. This time he did not get up; so I picked him up and hit him on the chin. He went down for a long count. I was through with him, and went and sat down.

The prisoners gathered around me. I could see that they were pleased with the outcome of the fight. "Pho Lar's had this coming to him for a long time," said one.

"He sure got it at last!"

"Who are you, anyway?"

"My name is John Carter. I am from Garobus."

"I have heard of you," said one. "I think we all have. The Morgors are furious at you because you tricked them so easily. I suppose they have sent you here to die with us. My name is Han Du." He held out a hand to me. It was the first time that I had seen this friendly gesture since leaving the earth. The Martians place a hand upon your shoulder. I took his hand.

"I am glad to know you, Han Du," I said. "If there are many more here like Pho Lar, I shall probably need a friend."

"There are no more like him," said Han Du, "and he is finished."

"You intimated that we are all doomed to die," I said. "Do you know when or how?"

"When the next class graduates, we shall be pitted against twice our number of Morgors. It will be soon, now."

CHAPTER VIII

PHO Lar was unconscious for a long time. For a while, I thought that I might have killed him, but finally he opened his eyes and looked about. Then he sat up, felt of his head, and rubbed his jaw. When his eyes found me, he dropped them to the floor. Slowly and painfully he got to his feet and started for the far side of the room. Four or five of the prisoners immediately surrounded him.

"Who's top man now?" demanded one of them and slapped his face. Two more struck him. They were pushing him around and buffeting him when I walked among them and pushed them away.

"Leave him alone," I said. "He has had enough punishment for a while. When he has recovered, if one of you wishes to take him on, that will be all right, but you can't gang up on him."

The biggest of them turned and faced me. "What have you got to say about it?" he demanded.

"This," I replied, and knocked him down.

He sat up and looked at me. "I was just asking," he said, and grinned a sickly grin; then everybody laughed and the tension was over. After this, we got along famously—all of us, even Pho Lar; and I found them all rather decent men. Long imprisonment and the knowledge that they were facing death had frayed their nerves; but what had followed my advent had cleared the air, much as a violent electrical storm does. After that there was a lot of laughing and talking.

I inquired if any of them were from Zan Dar's country—Zanor, but none of them was. Several of them knew where it was, and one scratched a rough map of part of Jupiter on the wall of our cell to show me where Zanor was located. "But much good it will do you to know," he said.

"One never can tell," I replied.

They had told me what I was to expect at the graduating exercises, and I gave the subject considerable thought. I did not propose attending a Morgor commencement in the role of a willing sacrifice.

"How many of you men are expert swordsmen?" I asked.

About half of them claimed to be, but it is a failing of fighting men to boast of their prowess. Not of all fighting men, but of many—usually those with the least to boast of. I wished that I

had some means of determining which were really good.

"Of course we can't get hold of any swords," I said, "but if we had some sticks about the length of swords, we could soon find out who were the best swordsmen among us."

"What good would that do us?" asked one.

"We could give those Morgors a run for their money," I said. "and make them pay for their own graduation."

"The slave who brings our food is from my country," said Han Du. "I think he might smuggle a couple of sticks in to us. He is a good fellow. I'll ask him when he comes."

Pho Lar had said nothing about his swordsmanship; so, as he had proved himself a great boaster, I felt that he was not a swordsman at all. I was sorry, as he was by far the most powerful of all the Savator prisoners; and he was tall, too. With a little skill, he should have proved a most formidable swordsman. Han Du never boasted about anything; but he said that in his country the men were much given to sword play, so I was counting on him.

FINALLY, Han Du's compatriot smuggled in a couple of wooden rods about the length of a longsword; and I went to work to ascertain how my fellow pris-

oners stacked up as swordsmen. Most of them were good; a few were excellent; Han Du was magnificent; and, much to everyone's surprise, Pho Lar was superb. He gave me one of the most strenuous workouts I have ever had before I could touch him. It must have taken men nearly an hour to disarm him. He was one of the greatest swordsmen I had ever faced.

Since our altercation upon my induction to their company, Pho Lar had kept much to himself. He seldom spoke, and I thought he might be brooding and planning on revenge. I had to find out just where he stood, as I could not take any chances on treachery or even half-hearted co-operation.

I took Pho Lar aside after our passage with the wooden sticks. I put my cards squarely on the table. "My plan," I said, "requires as many good swordsmen as I can get. You are one of the finest I have ever met, but you may think that you have reason to dislike me and therefore be unwilling to give me your full support. I cannot use any man who will not follow me and obey me even to death. How about it?"

"I will follow wherever you lead," he said. "Here is my hand on it—if you will take my hand in friendship."

"I am glad to do it."

As we grasped hands, he said, "If I had known a man like you years ago, I should not have been the fool that I have been. You may count on me to my last drop of blood, and before you and I die we shall have shown the Morgors something that they will never forget. They think that they are great swordsmen, but after they have seen you in action they will have their doubts. I can scarcely wait for the time."

I was impressed by Pho Lar's protestations. I felt that he was sincere, but I could not disabuse my mind of my first impression that he was at heart an arrant coward. But perhaps, facing death, he would fight as a cornered rat fights. If he did, and didn't lose his head, he would wreak havoc on the Morgors.

There were twenty of us in that cell. No longer did time drag heavily. It passed quickly in practice with our two wooden rods. Han Du, Pho Lar, and I, acting as instructors, taught the others what tricks of swordsmanship we knew until we were twenty excellent swordsmen. Several were outstanding.

We discussed several plans of action. We knew that, if custom prevailed, we should be pitted against forty young Morgor cadets striving to win to the warrior caste. We decided to fight in pairs, each of our ten best

swordsmen being paired with one of the ten less proficient, but this pairing was to follow an initial charge by the first ten, with our team mates close behind us. We hoped thus to eliminate many of the Morgors in the first few moments of the encounter, thus greatly reducing the odds against us. Perhaps we of the first ten overestimated our prowess. Only time would tell.

There was some nervousness among the prisoners, due, I think, to the uncertainty as to when we should be called upon to face those unequal odds. Each knew that some of us would die. If any survived, we had only rumor to substantiate our hope that they would be set free; and no man there trusted the Morgors. Every footfall in the corridor brought silence to the cell, with every eye fixed upon the door.

AT LONG last our anxiety was relieved: a full company of warriors came to escort us to the field where we were to fight. I glanced quickly around at the prisoners' faces. Many were smiling and there were sighs of relief. I felt greatly encouraged.

We were taken to a rectangular field with tiers of seats on each of its four sides. The stands were crowded. Thousands of eyes stared from the hollow sockets of grinning skulls. It might have

been a field day in Hell. There was no sound. There were no bands. There were no flying flags—no color. We were given swords and herded together at one end of the field. An official gave us our instructions.

"When the cadets come on the field at the far end, you will advance and engage them." That was all.

"And what of those of us who survive?" I asked.

"None of you will survive, creature," he replied.

"We understood that those who survived would be given their freedom," I insisted.

"None of you will survive," he repeated.

"Would you like to place a little bet on that?"

"None of your impudence, creature!" The fellow was getting angry.

"But suppose one of us should survive?" I demanded.

"In that case his life would be spared and he would be allowed to continue in slavery, but none has ever survived these exercises. The cadets are on the field!" he cried. "Go to your deaths, worms!"

"To your station, worms!" I commanded. The prisoners laughed as they took their allotted positions: the first ten in the front line, each with his partner behind him. I was near the center of the line. Han Du and Pho Lar

were on the flanks. We marched forward as we had practiced it in our cell, all in step, the men in the rear rank giving the cadence by chanting, "Death to the Morgors!" over and over. We kept intervals and distance a little greater than the length of an extended sword arm and sword.

It was evident that the Morgors had never seen anything like that at a commencement exercise, for I could hear the hollow sound of their exclamations of surprise arising from the stands; and the cadets advancing to meet us were seemingly thrown into confusion. They were spread out in pairs in a line that extended almost all the way across the field, and it suddenly became a very ragged line. When we were about twenty-five feet from this line, I gave the command, "Charge."

We ten, hitting the center of their line, had no odds against us: the Morgors had spread their line too thin. They saw swordsmanship in those first few seconds such as I'll warrant no Morgor ever saw before. Ten Morgors lay dead or dying on the field, as five of our first ten wheeled toward the right, followed by our partners; our remaining ten men wheeled left.

AS WE had not lost a man in the first onslaught, each ten was now pitted against fifteen of

the enemy. The odds were not so heavily against us. Taking each half of the Morgor line on its flank, as we now were, gave us a great advantage; and we took heavy toll of them before those on the far flanks could get into action, with the result that we were presently fighting on an almost even footing, our partners having now come into action.

The Morgors fought with fanatic determination. Many of them were splendid swordsmen, but none of them was a match for any of our first ten. I caught an occasional glimpse of Pho Lar. He was magnificent. I doubt that any swordsman of any of the three worlds upon which I had fought could have touched Pho Lar, Han Du, or me with his point, and there were seven more almost as good.

Within fifteen minutes of the start of the engagement, all that remained was the mopping up of the surviving Morgors. We had lost ten men, all of the first ten swordsmen having survived. As the last of the Morgors fell, one could almost feel the deathly silence that had settled upon the audience.

The nine gathered around me. "What now?" asked Pho Lar.

"How many of you want to go back to slavery?" I asked.

"No!" shouted nine voices.

"We are the ten best swords on Eurobus," I said. "We could fight

our way out of the city. You men know the country beyond. What chance would we have to escape capture?"

"There would be a chance," said Han Du. "Beyond the city, the jungle comes close. If we could make that, they might never find us."

"Good!" I said, and started at a trot toward a gate at one end of the field, the nine at my heels.

At the gateway, a handful of foolish guardsmen tried to stop us. We left them behind us, dead. Now we heard angry shouts arising from the field we had left, and we guessed that soon we should have hundreds of Morgors in pursuit.

"Who knows the way to the nearest gate?" I demanded.

"I do," said one of my companions. "Follow me!" and he set off at a run.

As we raced through the avenues of the dreary city, the angry shouts of our pursuers followed us, but we held our distance and at last arrived at one of the city gates. Here again we were confronted by armed warriors who compelled us to put up a stiff battle. The cries of the pursuing Morgors grew louder and louder. Soon all that we had gained would be lost. This must not be! I called Pho Lar and Han Du to my side and ordered the remaining seven to give us room, for the gateway was too narrow

to wield their blades within it advantageously.

"This time we go through!" I shouted to my two companions as we rushed the surviving guardsmen. And we went through. They hadn't a chance against the three best swordsmen of three worlds.

Miraculous as it may seem, all ten of us won to freedom with nothing more than a few superficial scratches to indicate that we had been in a fight, but the howling Morgors were now close on our heels. If there is anything in three worlds that I hate, it is to run from a foe, but it would have been utterly stupid to have permitted several hundred angry Morgors to have overtaken me. I ran.

THE Morgors gave up the chase before we reached the jungle. Evidently they had other plans for capturing us. We did not stop until we were far into the tropical verdure of a great forest, then we paused to discuss the future and to rest, and we needed rest.

That forest! I almost hesitate to describe it, so weird, so unearthly was it. Almost wholly deprived of sunlight, the foliage was pale, pale with a deathlike pallor, tinged with rose where the reflected light of the fiery volcanoes filtered through. But this was by far its least uncanny



aspect: the limbs of the trees moved like living things. They writhed and twined—myriad, snakelike things. I had scarcely noticed them until we halted. Suddenly one dropped down and wrapped itself about me. Smiling, I sought to dissentwine it. I stopped smiling: I was as helpless as a babe encircled by the trunk of an elephant. The thing started to lift me from the ground, and just then Han Du saw and leaped forward with drawn sword. He grasped one of my legs, and at the same time sprang upward and struck with the keen edge of his blade, severing the limb that had seized me. We dropped to the ground together.

"What the devil!" I exclaimed. "What is it? and why did it do that?"

Han Du pointed up. I looked. Above me, at the end of a strong stem, was a huge blossom—a horrible thing! In its center was a large mouth armed with many teeth, and above the mouth were two staring, lidless eyes.

"I had forgotten," said Han Du, "that you are not of Eurobus. Perhaps you have no such trees as these in your world."

"We certainly have not," I assured him. "A few that eat insects, perhaps, like Venus's-fly-trap, but no maneaters."

"You must always be on your guard when in one of our for-

ests," he warned me. "These trees are living, carnivorous animals. They have a nervous system and a brain, and it is generally believed that they have a language and talk with one another."

Just then a hideous scream broke from above us. I looked up, expecting to see some strange, Jupiterian beast above me, but there was nothing but the writhing limbs and the staring eyes of the great blossoms of the man-trees.

Han Du laughed. "Their nervous systems are of a low order," he said, "and their reactions correspondingly slow and sluggish. It took all this time for the pain of my sword cut to reach the brain of the blossom to which that limb belongs."

"A man's life would never be safe for a moment in such a forest," I commented.

"One has to be constantly on guard," admitted Han Du. "If you ever have to sleep out in the woods, build a smudge. The blossoms don't like smoke. They close up, and then they cannot see to attack you. But be sure that you don't oversleep your smudge."

VEGETABLE life on Jupiter, practically devoid of sunlight, has developed along entirely different lines from that on earth. Nearly all of it has some animal attributes and

nearly all of it is carnivorous, the smaller plants devouring insects, the larger, in turn, depending upon the larger animals for sustenance on up to the man-eaters such as I had encountered and those which Han Du said caught and devoured even the hugest animals that exist upon this strange planet.

We posted a couple of guards, who also kept smudges burning, and the rest of us lay down to sleep. One of the men had a chronometer, and this was used to inform the men on guard when to awaken their reliefs. In this way, we all took turns sleeping.

When all had slept, the smudges were allowed to burn more brightly, the men cut limbs from the living trees, sliced them and roasted them. They tasted much like veal. Then we talked over our plans for the future. It was decided that we should split up into parties of two or three and scatter; so that some of us at least might have a chance to escape recapture. They said that the Morgors would hunt us down for a long time. I felt that we would be much safer remaining together, as we were ten undefeatable sword-arms; but as the countries from which my companions came were widely scattered, and as, naturally, each wished if possible to return to his own home, it was necessary that we separate.

It chanced that Han Du's country lay in the general direction of Zanor, as did Pho Lar's, so we three bid goodby to the others and left them. How I was to reach faraway Zanor on a planet of twenty-three billion square miles of area, I was at some loss to conceive. So was Han Du. He told me that I would be welcome in his country—if we could ever reach it; but I assured him that I should never cease to search for Zanor and my mate.

CHAPTER IX

I SHALL not bore you with an account of that part of my odyssey which finally brought me to one of the cities of Han Du's country. We kept as much to cover as we could, since we knew that if Morgors were searching for us, they would be flying low in invisible ships. Forests offered us our best protection from discovery, but there were wide plains to cross, rivers to swim, mountains to climb.

In this world without night, it was difficult to keep account of time; but it seemed to me that we must have travelled for months. Pho Lar remained with us for a great deal of the time, but finally he had to turn away in the direction of his own country. We were sorry to lose him, as he had developed into a splendid companion; and we should miss his sword, too.

We had met no men, but had had several encounters with wild beasts—creatures of hideous, unearthly appearance, both powerful and voracious. I soon realized the inadequacy of our swords as a sole means of defense; so we fashioned spears of a bamboo-like growth that seemed wholly vegetable. I also taught Han Du and Pho Lar how to make bows and arrows and to use them. We found them of great advantage in our hunting of smaller animals and birds for food. In the forests, we subsisted almost wholly on the meat of the man-tree.

At last Han Du and I came within sight of an ocean. "We are home," he said. "My city lies close beside the sea." I saw no city.

We had come down out of some low hills, and were walking across a narrow coastal plain. Han Du was several yards to my right, when I suddenly bumped into something solid—solid as a brick wall; but there was nothing there! The sudden collision had caused me to step back. I stretched out my hands, and felt what seemed to be a solid wall barring my way, yet only a level expanse of bare ground stretched before me down to the shore where erratic combers surged at cross purposes along the beach. I said bare ground, but the ground was not entirely bare. It

was dotted, here and there, with strange plants—a simple, leafless stock a foot or two tall bearing a single fuzzy blossom at its top.

I looked around for Han Du. He had disappeared! He had just vanished like a punctured soap bubble. All up and down the shore there was no place into which he could have vanished, nothing behind which he could have hidden, no hole in the ground into which he might have darted. I was baffled. I scratched my head in perplexity, as I started on again toward the beach only to once more bump into the wall that was not there.

I put my hands against the invisible wall and followed it. It curved away from me. Foot by foot, I pursued my tantalizing investigation. After a while I was back right where I had started from. It seemed that I had run into an invisible tower of solid air. I started off in a new direction toward the beach, avoiding the obstacle which had obstructed my way. After a dozen paces I ran into another; then I gave up—at least temporarily.

Presently I called Han Du's name aloud, and almost instantly he appeared a short distance from me. "What kind of a game is this?" I demanded. "I bump into a wall of solid air and when I look for you, you have disappeared."

HAN DU laughed. "I keep forgetting that you are a stranger in this world," he said. "We have come to the city in which I live. I just stepped into my home to greet my family. That is why you could not see me." As he spoke, a woman appeared beside him, and a little child. They seemed to materialize out of thin air. Had I come to a land of disembodied spirits who had the power to materialize? I could scarcely believe it, as there was nothing ghostly nor ethereal about Han Du.

"This is O Ala, my mate," said Han Du. "O Ala, this is John Carter, Prince of Helium. To him we owe my escape from the Morgors."

O Ala extended her hand to me. It was a firm, warm hand of flesh and blood. "Welcome, John Carter," she said. "All that we have is yours."

It was a sweet gesture of hospitality; but as I looked around, I could not see that they had anything. "Where is the city?" I asked.

They both laughed. "Come with us," said O Ala. She led the way, apparently around an invisible corner; and there, before me, I saw an open doorway in thin air. Through the doorway, I could see the interior of a room. "Come in," invited O Ala, and I followed her into a commodious, circular apartment.

Han Du followed and closed the door. The roof of the apartment was a dome perhaps twenty feet high at its center. It was divided into four rooms by sliding hangings which could be closed or drawn back against the wall.

"Why couldn't I see the house from the outside?" I asked.

"It is plastered on the outside with sands of invisibility which we find in great quantities along the beach," explained Han Du. "It is about our only protection against the Morgors. Every house in the city is thus protected, a little over five hundred of them."

So I had walked into a city of five hundred houses and seen only an expanse of open beach beside a restless sea. "But where are the people?" I asked. "Are they, too, invisible?"

"Those who are not away, hunting or fishing, are in their homes," explained O Ala. "We do not venture out any more than is necessary, lest Morgors be cruising around in their invisible ships and see us; thus discovering our city."

"If any of us should be thus caught out," said Han Du, "he must run away from the city as fast as he can, for if he entered a house, the Morgors would immediately know that there was a city here. It is the sacrifice that each of us is in honor bound to make for the safety of all, for he

who runs is almost invariably caught and carried away, unless he chooses to fight and die."

"Tell me," I said to Han Du, "how in the world you found your house, when you could not see it or any other house?"

"You noticed the umpalla plants growing throughout the city?" he asked.

"I noticed some plants, but I saw no city."

They both laughed again. "We are so accustomed to it that it does not seem at all strange to us," said O Ala, "but I can understand that it might prove very confusing to a stranger. You see, each plant marks the location of a house. By long experience, each of us has learned the exact location of every house in the city in relation to every other house."

I REMAINED for what may have been five or six days of earth time in the home of Han Du and O Ala. I met many of their friends, all of whom were gracious and helpful to me in every way that they could be. I was furnished with maps of considerable areas of the planet, parts of which, I was told, were still unexplored even by the Morgors. Of greatest value to me was the fact that Zanor appeared on one of the maps, which also showed that a vast ocean lay between me and the country in

which I believed Dejah Thoris to be. How I was to cross this ocean neither I nor my new found friends could offer a suggestion, other than the rather mad scheme I envisioned of building a sail boat and trusting myself to the mad caprices of an unknown sea perhaps swarming with dangerous reptiles. But this I at last decided was the only hope I had for being again reunited with my princess.

There was a forest several miles along the coast from the city, where I might hope to find trees suitable for the construction of my craft. My friends tried their best to dissuade me; but when they found that I was determined to carry out my plan, they loaned me tools; and a dozen of them volunteered to accompany me to the forest and help me build my boat.

At last all was in readiness; and, accompanied by my volunteer helpers, I stepped from the house of Han Du to start the short march to the forest.

Scarcely were we in the open when one of my companions cried, "Morgors!" Whereupon the Savators scattered in all directions away from their city.

"Run, John Carter!" shouted Han Du, but I did not run.

A few yards distant, I saw the open doorway in the side of an invisible ship; and I saw six or seven Morgors emerge from it.

Two rushed toward me; the others scattered in pursuit of the Savators. In that instant a new plan flashed across my mind. Hope, almost extinct, leaped to life again.

I whipped my sword from its scabbard and leaped forward to meet the first of the oncoming Morgors, thanking God that there were only two of them, as delay might easily wreck my hopes. There was no finesse in my attack: it was stark, brutal murder; but my conscience did not bother me as I drew my sword from the heart of the first Morgor and faced the second. The second fellow gave me a little more trouble, as he had been forewarned by the fate of his companion; and, too, he presently recognized me. That made him doubly wary. He commenced to howl to the others, who were pursuing the Savators, to come back and help him, bellowing that here was the creature from Garobus who had led the slaughter at the graduating exercises. From the corner of an eye, I saw that two of them had heard and were returning. I must hurry!

The fellow now fought wholly on the defensive in order to gain time for the others to join him. I had no mind to permit this, and I pressed him hard, often laying myself wide open—a great swordsman could have killed me easily. At last I reached him

with a mighty cut that almost severed his head from his body; then, with only a quick glance behind me to see how close the others were, I leaped toward the open doorway of the otherwise invisible ship, a Morgor close upon my heels.

WITH naked blade still in my hand, I sprang aboard and closed the door behind me; then I wheeled to face whatever of their fellows had been left aboard to guard the craft. The fools had left no one. I had the ship all to myself; and as I ran to the controls I heard the Morgors beating upon the door, angrily demanding that I open it. They must have taken me for a fool, too.

A moment later the ship rose into the air, and I was away upon one of the strangest adventures of my life—navigating an unknown planet in an invisible craft. And I had much to learn about navigation on Jupiter. By watching Vorion, I had learned how to start and stop a Morgor ship, how to gain or lose altitude, and how to cloak the ship in invisibility; but the instruments upon the panel before me were all entirely meaningless to me. The hieroglyphs of the Morgors were quite unintelligible. I had to work it all out for myself.

Opening all the ports, I had a clear field of vision. I could see

the shore I had just left, and I knew the direction of the coastline. Han Du had explained this to me. It ran due north and south at the point. The ocean lay to the west of it. I found an instrument which might easily have been a compass; when I altered the course of the ship, I saw that it was a compass. I now had my bearings as closely as it was possible for me to get them. I consulted my map and discovered that Zanor lay almost exactly southeast; so out across that vast expanse of ocean I turned the prow of my ship.

I was free. I had escaped the Morgors unharmed. In Zanor, Dejah Thoris was safe among friends. That I should soon be with her, I had no doubt. We had experienced another amazing adventure. Soon we should be reunited. I had not the slightest doubt of my ability to find Zanor. Perhaps it is because I am always so sure of myself that I so often accomplish the seemingly impossible.

How long I was in crossing that dismal ocean, I do not know. With Jupiter whirling on its axis nearly three times as fast as earth, and with no sun, moon, nor stars, I could not measure time.

I saw no ship upon that entire vast expanse of water, but I did see life—plenty of it. And I saw terrific storms that buffeted my

craft, tossing it about like a feather. But that was nothing compared with what I saw below me as the storms at the height of their fury lashed the surface of the waters. I realized then how suicidal would have been my attempt to cross that terrible ocean in the frail craft that I had planned to build. I saw waves that hurled the mighty monsters of the deep as though they had been tiny minnows. No ship could have lived in such seas. I realized then why I saw no shipping on this great Joviterian ocean.

But at last I sighted land ahead—and what land! Zan Dar had told me of the mighty mountains of Zanor rearing their forested heads twenty miles above the level of the sea, and it was such mountains that lay ahead of me. If I had reckoned accurately, this should be Zanor; and these breath-taking mountains assured me that I had not gone wrong.

I KNEW from Zan Dar's explanation, just where to search for the stamping grounds of his tribe—a wild mountain tribe of fighting men. They lay in a land of meadows and ravines, on the east slope of the highest mountain and at an altitude of only about ten miles, or about half way to the summit. Here the air is only slightly thinner than at

sea level, as the cloud envelope retains the atmosphere of Jupiter as though it were held in a bag, permitting none of it to escape, while the rapid revolution of the planet tends to throw the atmosphere far up from the surface.

Most fortunate was I in coming upon the village of Zan Dar with little or no difficulty. Entirely invisible, I hovered above it, dropping down slowly.

There were people in plain view of me in the village as I dropped to within fifty feet of

the ground. I stopped the ship and hung there; then I demagnetized the hull; and, as the ship became instantly visible, I leaped to the door and pushed it open; so that they could see that I was no Morgor. I shouted that I was a friend of Zan Dar.

They called to me to land, and I brought the ship slowly toward the ground. My lonely voyage was over. I had surmounted seemingly unsurmountable obstacles and I had reached my goal. Soon my incomparable Dejah Thoris would be again in my arms.

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THE HAPPINESS ROCK

By ALBERT TEICHNER

Illustrated by ADRAGNA

IT was a particularly good asteroid, a great jagged rock roughly four miles square on one side and two miles at its thickest. Within five minutes of sighting it they knew that its flatter side turned away from the sun more than seven times an Earth day. That meant they should be able to land for mineral specimens and still be off in time to avoid the heating phase for which they were not equipped.

"I'll go out," said Warrant Officer Cramer, a tan-skinned young man who was peering ahead even more earnestly than usual.

"I'm Captain of this tin crate so it's up to me," said Hartley. "Right?"

"Right in a wrong sort of way, sir. Just two men on board and you're pulling rank!"

For a moment Hartley looked irritated, then his blue eyes

twinkled with laughter. "Give me one reason why I shouldn't."

"I've never been on an asteroid and I've been a little nervous about it. I don't want to keep barrelling around space with that kind of a faze-factor bugging the back of my mind."

The great flat side had just turned into shadow and Hartley started to ease the ship down. He said, suddenly bitter, "With all my experience the only thing the political brass lets me captain is a two-man scouter. Consider my rank unpulled—it's all yours Will."

Cramer gave him an appreciative glance and put on his outside gear.

"Let the Boy Scout have the dirty jobs," Hartley muttered, a nervous sneer twisting one side of his mouth. He idly adjusted for the descent onto the sheared stone face and, once Cramer was

in the exit chamber, exchanged a parting wave with him through the quartz window.

Queer duck, saying a thing like that, Cramer thought as he opened the outer hatch. *A little too bitter about things for his own good sometimes.*

But then his foot touched solid rock and he was too busy chipping specimens to worry about poor Nick. After each tiny chisel stroke his body bounced slightly away and, gripping the lead rope, he had to retrojet himself back into the circular light patch thrown by Scout III. The stuff was hard composition but, fortunately, with many straight stress lines so pieces slowly did come loose. One carefully placed blow, then a whirl of stars streaming across jet blackness, then a swing back into the light and another blow and another outward swing.

Suddenly a voice crackled in his ear. "You've been out fifty minutes, Will."

"It can't be!"

"Asteroid time's tricky when you're busy. How many chips you have?"

"About a dozen."

"How many do you want? Don't be such a glory boy, get in right now!"

AS he pulled himself along the line and up through the hatch he realized that not only

had he been undisturbed while on the rock but he hadn't even considered the possibility of becoming frightened! Pleased with himself, he closed the hatch door, raising the current in each magnetic lock to sealing maximum. As soon as the last bolt was sucked into place, his suit started decompressing while chamber pressure mounted in precise compensation. For a second he thought he saw a white speck eddy out of the specimen box attached to his belt but another did not follow. Anyway, suit vizors had a way of clouding up on the inside during chamber compression and that could play funny tricks.

Five minutes later, though, when he pulled off his helmet a little swarm of white specks welled up toward the ceiling. Then they were gone. *Funny*, he laughed to himself. "Funny, funny," he suddenly laughed aloud. "Talcum powder from the void!"

There was Hartley's face at the window, peering anxiously at him, and, for some inexplicable reason, that sight was even funnier. Shaking helplessly, Cramer slapped his knee and kept pointing at the face. *Life is so wonderfully wonderful!* he said to himself, unable to utter anything aloud now. *Wonderful wonderfully!*

After a while Hartley opened the door to the front cabin and



helped him to his cockpit seat. "Sorry, old man," Cramer gasped happily. "Don't know why I did that."

It was surprising how undisturbed by the private joke Hartley looked. He seemed to be too abstracted for that. "Feeling all right?" he finally asked.

"Perfect!" Cramer grinned, greeting the galactic reaches with a wave of his hand. "Isn't it a beautiful universe? I think I could count all the visible light sources out there in ten minutes if I wanted to. No, I don't want to count anything but my blessings, I just want to look."

"Not from here, though. This rock makes its crazy wobble into sunlight soon and I'd rather be off it when the surface starts heating up."

Hartley eased the craft upwards, pulling her back a few dozen miles. Then he balanced the power exhausts into *hover* and took the specimen box from Cramer's belt. "You've got ecstasy of the space deeps, never can tell when that'll strike a man out there." He studied the little slate-blue chips inside. "You notice that white stuff, Will?"

"First thought it was just vizor clouding." He was thinking with extraordinary clarity even though he still felt wildly elated. "Seemed to happen after the temperature moved above water-freezing."

"Yeah. You did everything by the book, son, except the thing that justified your excursion in the first place. When you came in you merely forgot to seal the specimen box and set its cryogenic cell for deep freeze. Bringing the chips into human temperature range may have destroyed some of the specimen's value. Usually doesn't matter but in this case I wonder—"

"Gosh, that's awful! I'd be glad to go out again."

"No, you may have stupidly done a smart thing. But you'll really boggle it this time with the ecstasy clouding your mind."

"I'm thinking clearly, really I am."

"Can't be."

"Okay," he said, "test me. Give me some digits to multiply while you punch them on the computer."

"All right," Hartley muttered impatiently. "38,373 times 14, 621 times 322. Satisfied?"

After a few seconds, "1-8-0-6-5-8-6-2-5-8-2-6."

Hartley pulled a strand of tape from the computer. "Repeat it slowly." Eyes widening, he followed the response on the tape. "You've got it right!"

"Satisfied? Seriously, though it's nothing when you know the tricks. Old-time non-machine calculating was one of my hobbies when I was a kid."

"It isn't 'nothing.' Space ec-

stasy ruins a man's ability to think straight for hours. Plenty of bodies are still drifting around space because in the early days they neglected the proper safety checks." He stared through the magnifier at the asteroid, its flat face now glittering in sunlight. "Starting to feel the hangover headache?"

"No, just fine. Nick, I've never felt this good in my life!"

"We'll wait here an hour."

BUT after the hour was up Cramer was still grinning. "I'm ready to go out again," he said.

Hartley stared at him. "Then it *was* that white stuff. Man, you've hit on something. There have been a few reports about this kind of untroubled ecstasy reaction but nobody ever spotted that powder. We're going back!"

When the asteroid was back in position again they dropped to the surface. Cramer started up but Hartley held him back in his seat. "This time I do pull rank. I'm going out myself."

Cramer shrugged. "I'm in too good a mood to offer the slightest protest."

"Your mood's why I'm going." He put on his suit and went into the rear chamber. A few minutes later he disappeared outside.

"Everything okay?" Cramer radioed.

"Sure thing. I'll be right back. This stuff flakes off like mica, easy to handle when you know the angles of the fault lines."

A few minutes later he was on board again. "You sure were fast!" Cramer exclaimed.

"Get the comp-decomp going and don't chew so much fat."

"Okay." He activated the self-compensating cycle and watched his superior through the glass. There it was again, a few specks from the specimen box. He, too, had forgotten the standard operating procedure! Then later, as Hartley took off his helmet, a swarm of them ascended like angry midges to the ceiling. In a few seconds the Captain was laughing more relaxedly than Cramer had ever seen him laugh before.

When Hartley came into the cockpit he exclaimed, "Wonderful! There's something like mica in these rocks and the powder's all over in the schists." He went to a corner and pulled some things out of an equipment cabinet but his back blocked Cramer's view. Still facing away, he headed back into the exit chamber. "Go out again," he said.

"But, Captain, you won't know what you're doing!"

Hartley gave an airy wave. "You did, didn't you?"

"Yes but—"

"No buts, my young friend. I'll be on the line. Anything goes

wrong, you turn on the winch and I'll be wrenched right back in."

"We'll be orbiting into sunlight and—"

"Forget it, I'll be back on time. There are only two universal laws, son—get happy and stay happy." He shut the door, put on his suit and ordered a compression recycling. As soon as it was completed, he jetted himself through the escape hatch.

AGAIN he was back very quickly but this time, as soon as the helmet came off, he whipped out a specimen slide from an inner pocket, waved it gaily through the talc cloud (*again*, he had left the box unadjusted!) and slipped the slide into a portable pocket microscope. He gripped the scope in his eye like a monocle and stood spellbound for five minutes until with a shout of joy he let the little electronic cylinder drop into his hand. "I'm going back out," he said.

"But, Captain Hartley, you'll get caught on the heating surface."

"Open the cockpit door!" As soon as he came in, he sat down at the controls and lifted the craft off. "See, Cramer, I can think straight, too, under the influence. You were right this time and I've listened."

Then he switched to hover.

"We're not going back *again*, sir, are we?"

"Of course," Hartley grinned. "After all, I made the same mistake you did. Twice I've let the temperature of the specimen box dekelvinise!"

Despite his continuing sense of well-being, Cramer felt uneasy, but there was nothing he could put his finger on so he didn't protest. Anyway, he could see Hartley would not be swayed now from whatever was his strange purpose.

A few hours later they settled back on the asteroid and the Captain went out once more. Cramer tried to watch what he was doing but Hartley was too huddled over the fault he was working for much to be seen. An hour later he came back in, and made some fix notations in his log book as soon as his suit decompressed.

They took off immediately. "This time the box stays locked," he said, pointing at the lid dial which showed the tiny atomic power unit inside was keeping the core's contents at Kelvin 90. Then he radioed the mother ship for a directional beam and locked the craft on automatic pilot. He glanced thoughtfully at his assistant. "When we come in I'll make the report."

"But I know that's standard, Captain, I learned it the first month at the academy."

"Just wanted to make sure you

remembered. How do you feel, Will?"

"Perfect."

"No after effects! Same with me!" He thumped Cramer's back in a hail-fellow-well-met spirit and Cramer thought, *Not such a bad guy sometimes.*

BUT, of course, that little outburst of camaraderie had to stop short as soon as they debarked inside the mother ship. The *Solar Pioneer* was strictly spit-and-polish, all twelve hundred feet of it, and as they came out of the scout craft hangar, there were brisk salutes to be exchanged and data registration books to countersign. General Chisholm, a natty man with brightly burnished swagger stick to match, was personally on hand to greet them.

"Anything of interest to report, Captain?" he snapped.

"Fairly routine, sir." He gave Cramer a silencing glance.

"That's the trouble, Captain, the whole voyage has been. You're the last craft in so we're heading back to Earth now."

Hartley held out the specimen box. "We spotted a good landing asteroid—one side flat as a mesa. Composition fairly similar to granite and mica."

"Nothing else?"

Cramer started to open his mouth but Hartley broke in; "Nothing, sir," he answered.

"The white stuff, sir," said Cramer, holding chin and stomach in.

The General glared directly at him. "You're out of order, Mister."

"Yessi—"

"Then don't say another word." He pulled out a little black book, made a notation and looked at Hartley as if no one else were there. "What's this about?"

"Nothing important, sir. We didn't have the specimen box set cryogenically a few times and when the temperature went up to human normal in the compression cycle chamber little water crystals flew out."

"Well, nothing unusual about that."

"But, sir," Cramer protested, "they couldn't have been just water."

"Silence!" Chisholm roared and two of his staff officers at the bend of a corridor turned to watch the fun. "Consider yourself under Probationary discipline, Mister Cramer. Informality's natural and permissible on a front-line craft like a scouter but chain of command has to be *absolute* on a dreadnought, you know that."

"I'm very sorry this happened, sir," Hartley apologized.

"When we land he's under your probationary control for the first five days of Earth leave. It's

up to you to teach him how to stay in line." He rubbed his brush mustache thoughtfully. "To begin with, though, it might be good to take him along to Analysis Lab just to show him how wrong he probably is even about the specimens. Any objections to that, Mister?"

"No sir!" he said, more hopeful now of exposing Hartley.

"A very good idea, sir," Hartley nodded unexpectedly.

They proceeded two hundred yards toward the stern where the Specimen Analysis Laboratory was located. In one long room there was a row of totally automatic equipment for both deepfreeze and normal temperature breakdowns. Sommers, the chief chemist, set the specimen box in a large, sealed chamber with one transparent side. When the inside temperature matched that within the box itself fine robot fingers unlocked it, withdrew samples and shifted them toward various test compartments. Meanwhile, Chisholm explained about the crystal cloud to the chemist.

"That must have been an exceptional batch," Sommers said, as he studied the response dial. "Very little moisture here. Nothing important to that one way or the other, though. Matter of fact, nothing important to these specimens in general—usual asteroid run."

Hartley impassively considered the shocked expression on Cramer's face.

"Confined to quarters for the rest of the voyage," snapped the General, turning his back on the miscreant.

AS Hartley led his ward to scout quarters, he kept shaking his head. "Shouldn't make trouble like that, Cramer. See where it gets you? I can't get ahead in this man's service so how far do you think *you* can go?"

"But you didn't tell him the most important thing. And the material in the lab didn't give off *any* whiteness even when its temperature was raised. I don't think you put in any new chips the third time you went out—I think you're trying to hide something!"

"Sure, right here." He pulled a pocket inside out. A few tobacco shreds were clinging to the lining. "Go ahead, tell them more and you'll keep getting into deeper trouble. Nobody will believe you anyway."

They stopped by the Recreation Room entrance to watch a foursome at ping pong. It was a good game, requiring special skill since the artificial gravity of the dreadnought-class craft varied slightly from that of Earth. "Come along," Hartley said finally, "no human company for you

until touchdown. When we're on *terra firma* I'll show you how silly you've been and you can get in on the ground floor for something really big."

Saying nothing, Cramer stepped into his little windowless cabin and listened as his door was locked from the outside. He broke open an emergency ration bar, munching sullenly until the idea came to him that the asteroid experience had to involve some new kind of drug Hartley wanted to keep to himself. He would have to convince the authorities that the matter warranted further investigation, chain of command rules or no rules.

Meanwhile, there was a week of isolation to be filled. There were thirty courses on his shelf to choose from, various things he had planned to learn when the occasion arose. Now there'd be enough time to absorb two of them. He set up the audio-visuals and started on the intensive twenty-four hour regimen that permitted even sleeping hours to be pedagogically fruitful.

A week later, as the *Solar Pioneer* settled in its magnetic cradle near Paris, he found himself master of *Old Sanskrit* (his eighth language) and *Luna: History of the First Settlements*. He also found himself once more face to face with the problem of Hartley's devious scheming. A

Probationer's badge was given him to wear before the Captain took him off the ship. Hartley accompanied him in a RobotCab toward the tower city twenty miles down the Seine from the ancient arrondissements.

"That powder was a drug," Cramer said as soon as they were alone in the cab. "You think you can turn it to private advantage but the idea's insane—everybody knows the dangers of drugs."

"That's the beauty of it—it isn't a drug." Hartley leaned back and crossed his legs. "There wasn't any after-effect, was there?"

"Doesn't mean a thing—drugs only do their real damage after repeated dosages. Joy can't be this free—you have to pay for it at horribly compounded interest when it comes this easily."

"I'm willing to wager we're going to find this stuff perfect, no side effects at all and—"

"The cry down through the ages, Captain, all drugs have been evil but this newest one is the exception. Until it turns out to be the same narcotic chimera, pure hell."

"—and, Mr. Cramer, it isn't a drug."

He threw up his hands. "A chemical working like that one did isn't a drug!"

"Did you ever hear of a narcotic drug that was alive?"

"Alive? Did you say *alive*?"

"That's what I said," he smirked.

"But then—. You mean it's a germ?"

"Ah, getting smart at last!"

"Then we're infected and you want to corrupt other people the same way."

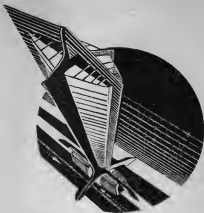
"Nobody can be infected."

Eyes glittering, he watched the first vast metropolitan tower grow ahead of them. "The germs die after a few minutes of body warmth—die and *completely* disintegrate. I saw it through the eye-socket microscope!"

CRAMER felt the first cold horror brush his brow like the substanceless touch of the wings of the angel of death, but he managed to stifle his incipient protest. It was more important than ever now that he find out what was being planned. "That is peculiar. I don't know whether it could be called a drug or not."

"It isn't one. But a name's not important one way or the other except sometimes for legal purposes. The important point's that here's something without any bad side effects because the body utterly destroys it." He pulled a cylinder from his pocket. It was the smallest deepfreeze unit generally available. "At least 100 cc in dormant *pure* form inside this cryogenic package."

"That's what you were doing



on the asteroid, gathering your own private stock!"

"Naturally. I saw that the powder lay in the schists and just scraped the stuff in and sealed it up." He patted the insulating ceramic. "Now we're going to see a friend of mine and, if I'm right, we have five million dollars in the palm of my hand."

"Why are you telling me this?" Cramer demanded.

"Because it's simpler to have you in on it than on the outside. Not that you'll be able to do anything even if you remain so naively Boy Scoutish about it. Who's going to believe your story at this stage of the game? There's an even better reason why you'll keep quiet, though, but I won't tell you that until later."

Cramer was still considering how he might snatch the capsule

away when the Captain dropped it back into a self-locking pocket of his suit. The cab had stopped before the sleekest tower on Boulevard Radial. Hartley jumped out, waving for Cramer to follow.

The elevator had several other people in it, all of whom eyed the Probationary badge with distaste. Any attempt to subdue Hartley would receive no support from these super-respectables.

The two of them got off at the eighty-seventh floor and were ushered into a vast, luxuriously-decorated chamber. About a dozen men and women were scattered about the room, boredly watching a color symphony unfold on one wall. They were all dressed in the sort of highest fashion glitter which evoked as much disgust as amusement among most space workers. But Hartley was obviously not typical of his breed; he enjoyed coming among these people, livening up as soon as he saw them.

A tall, blonde man came slowly toward them, wearily rejoicing. "So glad to see you, Hartley. Ah, a Probationary in tow—well, any Probationary is a fellow friend in the kingdom of chaos."

Hartley perfunctorily introduced them, then glanced around. "Drinking nectar?"

"It kills time, can't do any damage and—I know what

you're going to say," he grinned, "it's a bore!"

"Well, it is, you should be on to something stronger."

"You gone space gaga?"

"Not at all, Neilson."

"Who would bother with what isn't safe? Everyone knows down to the last nerve tremor the consequences of really good stimulants. We've seen it, smell- and feel- visioned it through social indoctrination procedures to the point where no one would dare. All we can do is stick to the legally permissible alkaloid-heightened caffeine derivatives."

"Suppose I told you there is something new, something perfect *and* safe?"

"I'd say gaga again, sheer lunacy!"

"All right, just listen." He recounted their experiences on the asteroid and, despite himself, Neilson began to show real interest.

"And you have a capsule?"

"Yes, want to try a fleck? That's all you need, I think."

"Oh no!" Neilson exclaimed.

"Not until I've run the tests."

"Well, that's what I'm here for. You're a biochemist, you have all the equipment."

CRAMER looked disdainfully at the man. The type was common enough—probably knew next to nothing about his specialty. But—and this was what

made it doubly revolting—he didn't have to know in order to be an expert. Good equipment could do *all* the work in most cases.

Neilson waved languidly toward his other guests, mumbling, "See you shortly," and let the pair through a series of golden rooms to his Analyzer Laboratory. There he took the capsule from Hartley and placed it in a cryogenic tester similar to the one aboard the *Solar Pioneer*. After temperature adjustments were made, tiny filament hands began lifting out specimen flecks and shifting them to various test sections.

"Odd stuff," murmured Neilson as he surveyed the preliminary sheet punched out by the reporting machine. "It's a living organism and—and it's *silicon*-based! That's a real weird one. Its biological action in the human body wouldn't be like any narcotic, completely new. Can't read the next stuff—ah, here's the translation—heightened hormone discharges, not one of which is detrimental. Metabolic cycle of bacteria somewhere between three and four hours."

"The spin period for the asteroid! This stuff's likely to be available hundreds of places in the asteroid belt, wherever the spin period's in that range. Might have an endless supply because in its native habitat it re-

appears after the heating phase even though something in the human body destroys it permanently."

Now summaries were being pumped out more rapidly and Neilson was scanning them with unwonted speed. "Fleck dose too small for *any* endocrine upset. None for musculature either. Gastro-intestinal negative. Bone marrow negative. Ten minutes after entering the body this stuff dissolves completely into *lower* elements! Physiologically non-habit-forming. Hartley, if this gives all the pleasure you claim it's the answer to our wildest prayers. I will try a fleck."

As soon as he inhaled the infinitesimal dosage he began grinning at the pair in speechless wonder. Hartley joined him and offered to set a bit up for Cramer.

"No," Cramer said, "I don't care what the analyzers say. You can't get something for nothing."

"This is beyond price," Neilson sighed contentedly. He moved to a wall mirror. "Not even a little retinal contraction. The dosage is so small the silicon base couldn't hurt you even if you took one an hour for the rest of your life. And there can't be any hangover."

"No law on the books against it and I don't think the public would tolerate a prohibition. This stuff is actually *good* for you!" Hartley exulted.

"And we are the only ones on Earth who have it for at least the next few weeks!" He jotted down some calculations. "Figure a hundred thousand doses in the capsule and at least fifty dollars a microscopic flake slice, seventy-five dollars, more probably. Anybody can lay his hands on cryogenic capsules—they're all over the place. We'd only need a few dozen runners and I can get them easily enough. Are we in business, Hartley?"

"Let's give a free sample to your friends first."

"Fair enough, they're going to be among our best customers."

Cramer watched in horrified disgust as the others were summoned and willingly passed over into the fully-conscious ecstasy. But why the horror? Why the disgust? he demanded of himself. Why condemn something that even the Specimen Analyzer showed to be wholly beneficial? He couldn't find the tangible reason but that didn't matter; there had to be something wrong somewhere.

"Still not with it?" Hartley asked after a while.

"I'd just as soon not bother quite yet."

"Well, you do know what you're missing," shrugged the Captain. "My Probationary rights don't give the privilege to insist on this. As I told you, complaining to authority wouldn't

change anything but now I'll give you the biggest reason why. Even in the highly unlikely case of their believing your story, they couldn't move against me because they'd know it wouldn't matter. First I'd see to it that word got out about germ-joy. There are hundreds of craft on the Mars run that can detour into the asteroid belt and pick up a supply once they know what to look for. Look at all the freighters that do a little bootlegging on the side now—there'd be no way to seal off that supply."

"I can see that," Cramer agreed. "I'm not interested in reforming anything. I just don't want to be personally involved."

"Perfectly all right," Hartley said thoughtfully. "Each man to his own tastes. "Then he moved away to discuss business arrangements with his host.

How do I get out of here? Cramer wondered. *And how do I get anybody to listen, to believe such a wild story from a Probationary? Or would it be best to string along with them and see what happens?*

TRYING all the while to hide his anxiety, he struggled with a dozen problems that seemed to have no solution, that might not even deserve a solution if the stuff were as harmless as it had shown itself to be so far. For the present, he had to appear to be

one of them; just before going in to dinner, he asked for a fleck and there was a patter of applause from everyone with jovial cries of "For he's a jolly good fellow!" and "Now you're talking!"

There was no denying the renewed sense of youthful cleanliness it gave him, as if every nerve of his body had been gently washed down to dawn of life freshness.

The main course consisted of yeast snow nectar laced with rare confectionary spices that broke evanescently on the palate and then subtly vanished to make way for the next clearly-distinct sensation. Behind his own mask of laughter Cramer drowsily watched all the other chattering faces. After a while there only seemed to be the glitter of eyeballs and silver and perfectly-spaced teeth sinking into nectar, and he got up with the assistance of Hartley and Neilson to accompany them sleepily, oh so yawn-sleepily! away to another room. . . .

He saw himself floating from afar toward the asteroid, its rougher side glowing in the sun, the flatter one a sable blank. He moved slowly through a viscous atmosphere, one joint stickily shifting after the other. An enormous flake of whiteness settled on his face and he inhaled. To be *this* happy, *this* content! And again the movement around

the surface as gradual as the turning of the asteroid itself. Over and over again, never an end to it, while another flake drifted inexorably toward his upturned face. And again that final happiness.

He swung imperceptibly, across the surface of his new home as it streamed in an arcing line along the invisible orbit of the asteroid belt. And always at the right interval another floating flake.

When the voices came to him they were hardly wanted and totally unneeded but, although he did not listen, he heard them and even identified their owners.

"He's hooked now," Hartley was saying.

"I guess so," Neilson answered. "But it's not physiological."

"Who cares about that? *Psychologically* he's going to want the stuff from now on—any sensible person would. You know, we're actually doing him a favor, destroying his inhibitions against something so harmless."

"Which doesn't concern me one way or the other."

"Well, maybe it would have been neater just to get rid of him but Probationers have to report to HQ at the end of their punishment periods. If he doesn't go in today there'll be an investigation and, believe me, Neilson, they'd trace down my every movement

and get an electronic hold on me that I couldn't shake. The whole thing would come out."

"A lot of good spilling our beans would do the government. Someone else would just bring in the happy germs."

"Yeah, but this next month's the time when *we* make our killing. Hey, I think he's starting to wake up."

"No, prob—"

Neilson's answer mumbled itself away and he found himself floating across the flat face of the asteroid, waiting for the next huge flake to descend.

. . . And then he was really awake. He discovered that he was leaning against the back of a heavily-padded chair, alone in a guest bedroom. Approaching footsteps told him the pair was returning and he hastily shut his eyes. This had to be carefully managed.

"Ought to be waking up about now," said Neilson.

Cramer started stretching, then rubbed his lids and blinked at the light. "Give me a fleck," he pleaded. "Just a little bit."

The two of them nodded to one another and Hartley leaned forward. "Takes a little while to get it out of the freezer, Will."

"I want it now," he said petulantly.

Hartley gave his shoulder a comradely squeeze. "One of the gang now, eh? Come along and

you'll get it. You have to report to HQ."

"I have five days Probationary." He got up and followed them a little unsteadily to the cryogenic freezer in another room.

"Five days are up," Hartley explained. "You've been doing a lot of sleeping, even were sleepy when you got up to eat."

"Don't understand."

"I'll tell you after you get our sniff."

"Yes, that's what I want now."

ONE tiny fleck came out on a holder the size of a fingernail paring. It was frightening how quickly they had developed techniques for handling the stuff.

"Take it fast!" Neilson shouted. "That germ colony's worth eighty dollars and it's breaking down fast. You won't get another."

Cramer leaned forward to quickly breath it in. By the time he exhaled it was already working its magic. He straightened up and smiled with hangdog gratitude. "Oh, that's good!"

"Had to get you used to it," Hartley said. "Only reason why we kept you sleepy—you'll thank us some day."

"Some day? I thank you now!"

Neilson gave him a friendly handshake but his eyes were

coolly observant. "Okay," he nodded for Hartley's benefit.

Hartley glanced at his watch. "The stuff's all gone by now. They can't find a thing even if they do give you a checkup."

"But the silicon—"

"Not a trace," Neilson said. "This thing even breaks up on the atomic level, takes a little longer than the germ death but inside an hour no silicon."

"But the fission breakdown—"

"Don't ask me," Neilson shrugged, "it doesn't work that way. Must have something to do with the beautiful energy charge you get from germ-joy."

"Feeling clear-headed?" Hartley asked.

"Sure, I'll be right back for some more after I report."

He went out, grinning inwardly. They were right about one thing—it wasn't physiologically habit-forming. And he just did not have the kind of psychological defect for it to be habit-forming any other way.

When he reached Space Pioneer HQ he handed in his card at the Probationary desk. The Major in charge looked him up and down in stony silence, then suddenly barked, "Anything to say, Mister?"

"Yes sir. I want to register a complaint with General Chisholm personally."

"What!" His face turned beet red. "Look, soldier, we're not

strictly GI in this outfit out of love of red tape. This is a dangerous service. You have to follow the chain of command every time." He entered a black mark on the card. "Tell your immediate superior."

"He's the one I'm complaining against, sir."

"Then go see the Inspector General!"

"The time lag, sir, it would take too long to reach General Chisholm."

The Major violently punched another mark on the card. "Wipe the grin off your face, Mister. What's so funny?"

"That's part of my complaint, sir. I've been drugged to joy."

"I really ought to call the General. You'd make a perfect punishment example."

"Just as long as I get to talk to the General, sir," he said, confidence in his success gone even if the evil stuff kept him feeling so good.

"Wait in the outside room." He reached for a phone. "Who's your immediate superior?"

"Scout Captain Hartley, sir." He went out and sat down on the edge of a chair. No, it wasn't going to work, he could just see it wasn't.

Then the Major was striding out and shouting, "Follow me, the General actually wants to break you in person!"

Cramer sighed and followed



him up an escalator, then past two receptionists and two private secretaries. The Major pointed at a small door. "You go in on your own, soldier."

HE turned the knob and stepped nervously into a room which was bare except for a glass-topped desk behind which General Chisholm was seated and a few wrought-iron chairs facing the desk. The General stared at him as if he weren't there but would materialize under prolonged scrutiny. "Sit down and tell me what this is all about," Chisholm said, raising one index finger from the desk.

Cramer sucked in his breath and the story came pouring out, faster and faster all the time as if he were racing against the moment when Chisholm would bark for silence and bring him crashing down. But the General said nothing, studying first one cuticle, then the speaker's face, then back to the next cuticle.

Suddenly he slammed on an intercom and said, "Get Dr. Jonas and tell him to bring a portable blood test rig."

"Then you *believe* me, sir?" Cramer was too stunned to remain safely silent.

"Of course I don't, Mister, but there's too much smoke for no fire."

"The silicon trace may not show up now—"

A smile flashed up Chisholm's face, then disappeared. "Those are the chances you take when you tell sensational stories."

Cramer's heart sank once more. "Yes, sir."

The specialist arrived with his test machine rolling behind him like an obedient, lumbering mastiff. When he reached the center of the room he turned a dial on his signet ring and the machine stopped.

"This young warrant officer has given me an interesting account of his recent experiences which, he would have us believe, included being drugged into sleep and semi-sleep," said Chisholm. "I want you to test blood samples for silicon traces, in fact the whole gamut of tests."

Dr. Jonas' pointed chin sank toward his chest, then rose. "Yes, General Chisholm." He pulled up Cramer's left sleeve and applied a blood-sucker tube which clicked off drops until it reached fifty and stopped. The doctor set the fractionating apparatus on automatic and approached his superior's chair to say, "I hardly think a person could be sedated with a silicon compound, sir."

Chisholm gestured for Cramer to remain silent. "All right, while we're waiting for your machine to complete its run, here's a purely hypothetical problem. Imagine a silicon-based *bacteria*,—"

"What?" Dr. Jones exclaimed.

"I said a silicon-based bacteria. It raises human metabolism when absorbed into the blood stream in the form of a tiny frost flake, a flake whose very atomic structure breaks down the elements scale without the explosive force of nuclear fission or any other kind of serious disruption."

"I'd say the whole thing's impossible, sir!"

"But let's just suppose it is not."

"Then I'd have to proceed on the assumption that the life cycle of the hypothetical form permits it to reach a high threshold of energy storage, part of which energy is smoothly released while the rest achieves a new balance as the silicon transmutes into elements of lesser weight."

"Sounds like a reasonable explanation for something unreasonable, doctor," he stiffly observed. "Your tests should be ready now."

DR. JONAS looked satisfied as he pulled the tape from the machine. "No silicon." He stopped, frowning. "But there is indication of massive barbiturate dosages. This man *has* been drugged! There shouldn't be any lasting damage—he's a healthy specimen all right—but whoever did this wasn't worrying about his welfare, General."

"Thank you, Dr. Jonas, you may go now." He casually leaned back in his chair. "This is Top Secret for the present. I will be consulting you later on this matter."

"Yes, sir."

But as soon as Jonas and his equipment were gone the General sprang into frantic action. "You're under arrest, Mister."

"Sir!"

"Protective arrest—although it won't be announced that way. No time for explanations right now. Give me the precise reading and time for that asteroid."

When he had the information he activated a keyboard at one side of his desk which fed the orrery computer several miles away. A few seconds after he punched in the data, the reply came back with the exact present location of the asteroid. He immediately threw a switch which lowered the lights and simultaneously splashed a map of the solar system on all of one blank wall. The map carried the caption *Pioneer Logistic* and showed a dozen labelled points scattered throughout the system's inner and median reaches. A few were moving very slowly while others appeared to be at rest.

After a minute's careful scrutiny the General leaped to his feet, muttering, "Good, good, Hazelton can get there in four hours." Starting his sender, he

brought on Message Center and commanded: "Get me Admiral Hazelton on the *Star-Seeker*. Top Priority Instant Action Field Officer Line."

Cramer, accustomed to slower transmission channels, was startled by the speed with which Hazelton's voice came into the room "Standing by, General."

"Admiral, have your daily code book handy?"

"Right here."

"Put her on today's complete garble in precisely ten seconds." He set his own coder and waited. "Okay, Hazelton, are you receiving me clearly?"

"Perfectly, Chisholm."

"All right, now nobody else can follow what I'm going to tell you. Immediately shift course for 325.83.21 in asteroid quadrant, subsection 38." A protesting squawk came hurtling across space. "First give your people my orders, then I'm going to tell you why."

Cramer gaped as he heard his superior start to repeat his story. The General *must* have believed it!

Ten minutes later Hazleton broke in with a final "Oh, my God!" For a while only his heavy breathing could be heard, then he said, "Chisholm, if there's anything to this it's the worst social catastrophe of the century!"

"I know it. Contact me as soon

as you have a sample analyzed. You should be able to manage in six hours or so—this line'll be open at all times from now on. Off."

Chisholm came back to the desk and looked steadily at Cramer. "You sure have me going far out on a prestige limb."

"I never expected anybody to believe me, sir," he replied, all gratitude.

"I still don't but we can't take any chances. I know something has to be going on. You see, Captain Hartley resigned from the service yesterday."

"But he's still under your command for three months, isn't he?"

"No, he's a free agent. He entered a Categorical Resignation. That means he's giving up all benefits accruing to a man of 25 years standing but his resignation is immediately effective."

"You could still arrange for his arrest through the civil channels."

"I doubt whether any continental president would care for that idea, I know I don't. Your former Captain's a very shrewd man, he knew we'd see how helpless we are—I only hope that you're lying through your teeth!"

"If I don't return soon, General Chisholm, he'll suspect something."

"Again, it doesn't matter very

much." He sat down and rubbed his chin. "If we let you go back, do you think he'd let you see how they're organizing their operation? True, it would be more convenient for him if, for a few more days, we wouldn't be investigating him—that's why he took the chance of letting you report back here and avoided the Probationary hunt. To his way of thinking, chances are that you'll want further dosages and keep quiet. But why should we expose you further to that stuff when the possible sacrifice involved won't give us any more information?"

"Then you're just going to surrender the point, let him realize you know and won't do anything about it?"

"Not exactly. The best we can do is keep him uncertain about you. Officially, you've been arrested for insubordinate behavior by a martinet General who's decided to make a horrible example of you. Someone looking like you is going to be seen entering a punishment craft heading for a monotony run to check the automatic satellites around Uranus. That's the stupid best we can do—we're over a barrel." His sharp eyes suddenly dug into Cramer's. "You'll be in isolation quarters for the next few hours. I only hope that you'll deserve to stay there, that your story is all malicious nonsense!"

CRAMER was escorted to a small cell where there were no audio-visuals, only old-fashioned printed books. He picked up a few of them, stared at the title pages without knowing what he was reading, then began to pace his cell.

What if they didn't find a germ sample? After all, nobody had ever spotted the stuff before.

No, they knew what to look for now and that made a difference.

But maybe it didn't in this case.

And what made them feel so helpless? What gave Hartley that much of an advantage over a General of the Space Deeps?

Nothing added up and it seemed he had been shuffling the crazy pieces for a week when they came to take him back to Chisholm's office. The clock, though, told him only eight hours had passed.

Another man was in Chisholm's office now and he recognized him as soon as he came in—Shelby Johnson, President of North America. The newcomer nodded grimly as they were introduced to each other.

"President Johnson is here incognito, came by a private entrance," Chisholm explained. "You're not to mention this anywhere."

"A real mess!" Johnson ex-

claimed. "But at least there was someone decent enough to give us forewarning. This stuff's supposed to be so effective, no hang-over, no known damage to the system—why didn't you go along with Hartley's reasoning?"

"There has to be some bad long-range effect, nothing comes that cheap."

"I only hope you're right." Johnson's grey eyes seemed to be focussed far off. "Otherwise the social damage will be terrible."

"*Everything* you told me has been confirmed," said Chisholm. "Scouts had no trouble finding a batch and the tests confirm that it's seemingly harmless, breaks down completely."

"Then why don't you arrest Hartley?"

"That would just spread knowledge of this even faster. He's probably seen to it that will happen and can hold it over our heads."

"Counter the thing with a propaganda offensive, highlighting the evils."

"What evils? Young man," the President broke in, "Who's going to be scared off from something that sounds so harmless? Two things are working against us—the supply's easily replenishable and testing equipment's much too common for us to put over any white lies."

"Still hard for you to under-

stand, isn't it?" Chisholm sighed. "Cramer, a terribly big percentage of the population has become passive and bored, just looking for some easy diversion. We have all we can do just to keep this social cancer from spreading without germ-joy. *With* it, matters can get out of hand. And I don't care how automated and wealthy a society is it can't get by if we develop *that* big a burden of non-thinking freeloaders."

"General Chisholm isn't wholeheartedly with the plan I've adopted but—"

"But I haven't a thing better to suggest, Mr. President, the General conceded."

"Who does? Well, the plan for the next few weeks is this, to keep very close surveillance of Hartley's activities without openly conceding we know what he's up to. We have to hope that some defect will show up in a user even though the first report says no one sees how it can happen."

Cramer protested. "You're going to let him get away with it!"

"For the present," President Johnson nodded. "We're not interested in punishing a particular man. We have to give him all the joy-rope he needs and hope that he, as the longest-run user, suffers the consequences."

"I could keep taking it myself if you need a guinea pig."

"The rasher section of the public will supply enough guinea pigs," said the General. "You'll stay here at HQ, looking over all the reports that come in, Mr. Cramer, maybe your experience will help somewhere along the line. If, after a few weeks, nothing shows up, we will crack down on Hartley anyway."

"Not that it will do much good," said the President. "But we, too, need our moments of purely personal satisfaction."

THE following day Cramer was given a robot-run suite high in HQ Tower. His human contacts were restricted to a few total security clears who occasionally brought him messages too delicate for transmission on the building's internal net. Inured to the isolation-training of the spacenaut, he was not disturbed by the lack of company.

But within two days a message arrived that did disturb him. The *Star-Seeker*, returning with its precious capsules of asteroid bacteria, was still a week from Earth base and already one scout who had somehow sampled germ-joy was under forcible restraint for trying to get additional dosages. Medical analysis showed no physiological addiction but it did indicate some purely psychological craving triggered by merely one dose. The scout was not moved by the warnings of the

frost flake's possible danger since there was no binding proof of it.

Chisholm had scribbled across the bottom of the document: "This is likely to become the classic form of our difficulty, the refusal to see horror unless it can be shown. And here again it's happening to a Space Service man!"

Cramer shuddered at that. The Service contained the cream of Earth's manpower. If germ-joy could bring out their psychological weaknesses, how much worse the effect was bound to be among the listless, bored masses!

As the days went by there were occasional reports on Hartley's activities. With Neilson's help his agents had smoothly eased into many sectors of the scientific underground and huge quantities of money were moving up through the distribution hierarchy. There were even spy reels for him to run off on his projector, reels which showed the ex-Captain looking fantastically youthful and self-satisfied.

Once in a while the bitterly ironic thought came to Cramer that maybe Hartley was inadvertently on the right side. Suppose, just suppose that germ-joy was actually *good* for humanity! More than ever he longed for some evil effect to become manifest even if it meant he, himself, should be stricken by it.

Eventually he was summoned to Chisholm's office where several scientists were gathered. The feed lines for a Medical Computer had been set up there and he was put through another rigorous checkup. At the end of a half-hour Dr. Jonas threw up his hands and said, "You're in perfect health. Still no after effects—I don't think there'll ever be any. How could there be?"

Chisholm considered Cramer almost resentfully. "You're too damned healthy for our own good! Dr. Phillips here has equally bad news—he's a biophysicist."

Phillips, a skinny, dark-haired man, tried to smile through his look of bewilderment. "We've absolutely run through the testing gamut on the stuff *Star-Seeker* brought back. Ultra-high microscopy shows no RNA or DNA in our frozen samples, in fact nothing to carry the genetic pattern—yet we know it's alive! We've no way of coping with something so radically different, something that breaks all the way down the atomic scale so peacefully. It can only be controlled by some *sub-atomic* patterns unknown to us."

"There's no way to probe it sub-atomically?" asked Cramer.

"Not at this fine a level. What methods we have show nothing exceptional there after the silicon breaks down." He frowned in

a dreamy sort of way. "A lot of tiniest subatomic bits are still a total mystery, too small for our analytic tools to grapple with. If this stuff would reappear in some analyzable form now we could learn an awful lot about those unknown interactions. Fat chance of that, though!"

"We'll wait another week," said Chisholm, "then, if nothing's happened, we'll pull Hartley and his crew in and hope the public won't end up in his corner. There are probably several thousand regular users already. We already have a few *scientists* saying the stuff's all right, that we should *encourage* its use!"

"Idiocy," observed Phillips sadly, "is no respecter of high IQ's."

THE week went by more and more slowly in Cramer's tower suite and all the reports only confirmed the General's forebodings about the spread of germ-joy's appeal. Someone else had somehow brought in a batch and was distributing it through a new, completely independent set-up. And everywhere there were vague rumors of a beneficial substance that 'they', the eternally conspiratorial 'they' of undefinable higher authority, were keeping from popular use.

Then, on the seventh day, Cramer had the rash.

It encircled only the wrist of

his left hand but the red splotches itched so violently that he immediately called in the medical team. By the time the doctors arrived it was already subsiding. A sample from the splotch area, though, showed a significant trace of silicon but none of the bacteria.

"Somehow the element reformed!" Phillips exclaimed. "We're approaching the breakthrough!"

Cramer watched the splotches shrink into themselves, fearfully wondering what the next phase would be. But, an hour later, this turned out to be bitterly anticlimactic for the assembled group. A urinalysis showed that his body had thrown off an amount of silicon roughly equivalent to the amount he must have taken in through the flakes.

"Looks like you've passed through your crisis," Jonas said. "You're in perfect shape again."

The scientists all looked crushed but their mood changed to annoyance when they saw Cramer's enthusiastic grin. "Don't you see?" he said. "If this happened to me, it should be happening to Hartley too. He got his first sniff only a little while after I did, so the incubation period's the same for him!"

"Unless the large amount he's taken in since then actually confers immunity," Phillips muttered.

Cramer's face fell but he persisted. "We have to find out one way or the other, don't we?"

"No doubt about that!" Phillips called Chisholm's office and explained what had happened.

"Then the operation's on," the General told him, happy to be acting at last. "Hartley's at Neilson's place and we have to get him. Bring along all the test equipment you'll need."

WHEN they broke into the vast penthouse apartment they found nobody around. As they went through one empty chamber after another, they became increasingly nervous. "The building's been thoroughly staked out," Chisholm fumed. "We know he hasn't left this floor."

Then, in the last chamber, they found him. He was lying on a silken couch, breathing heavily, and when they came closer they saw that all visible parts of his body were covered with angry splotches.

"Get the cameras going," barked the General.

"No, do something for me," Hartley gasped, staring in horror at his hands as if waiting for something to appear there. "All ran away, all of them."

As they watched, the splotches on the back of each hand exploded into running sores. While an assistant took a sample from one

of the evil, flowering things, Jonas held an anaesthetic bottle to the sinking man's nostrils. But it had no effect and he only groaned the louder, demanding surcease.

More sores opened up on the neck while most of the team frenziedly attended to the Analyzer. One of them came up to the foot of the couch where Cramer was standing with Chisholm and Jonas and whispered to them: "Now it's a silicon *virus* and it's inducing massive flash-cancers!"

Phillips was too absorbed in some abstruse calculation to look toward the couch any more. "What a breakthrough!" he suddenly exclaimed. "We'll be able to extrapolate the interactions now!"

"Any danger of catching anything from him?" Chisholm asked, looking at the pulullating mass.

Jonas glanced at a report tape that had been handed to him. "No, you don't pick up carcinomas that way. And we know from Cramer's experience today that the victim only erupts into

this when a certain critical intake has been exceeded."

There was one final gasp and Hartley lie dead, his mouth the only remaining recognizable feature. Chisholm steeled himself to look at the human wreckage with the objectivity of the nearby camera. "Horrible, but it would have been worse if it hadn't happened, if we didn't have this proof. A different kind of horror, social and slow, but even worse. This way only a few die, not the race."

Cramer heard the General pick up a phone and ask for President Johnson, and all about him there was the clamor of excited researchers getting on with their jobs. But he could not turn away from the ugly spectacle of this death quite yet, nor could he feel any exultation before it even though he knew this outcome was the most desirable of all available possibilities. When you had sailed across the farther deeps with one comrade you had to remember him for whatever had been best in him, not worst.

THE END

EDITORIAL

(Continued from page 5)

ERB reprint this issue, on P. 44: The enormous amount of Burroughs material has prompted Camille Cazedessus, Jr., of 2350 East Contour Drive, Baton

Rouge, La., to issue *ERB-dom*, a quarterly fanzine devoted entirely to you know what. And a valuable adjunct it is to those who want to keep up with the doings emanating from Tarzana, California.



THE SPECTROSCOPE

By S. E. COTTS

The Worlds of Science Fiction.
Edited and with an Introduction
by Robert P. Mills. The Dial
Press. \$4.95.

Though no longer editor of an S-F magazine, Robert Mills has not been letting the grass grow under his feet, as witnessed by the publication of this anthology. For, although a peek at the table of contents shows all the old familiar authors along with old and for the most part familiar stories, this is far from being "just another collection." What saves it from this fate is the fact that each story presented is each individual author's favorite, and not just on Mr. Mills' say-so either. For Editor Mills has accomplished no less a feat than having bamboozled each writer into writing his own introduction, telling the reader why it is his favorite. This kind of idea furnishes the reader with a field day and opens up all sorts of intriguing questions that will prob-

ably affect our attitudes toward these writers forevermore. For instance, is the particular story in question the one we would pick as our favorite for the writer? What kind of judge does an author make in regard to his own work? Is the story in question a maverick in style or content, or is it typical of the author? How does this brief insight into the author affect our perception of his other stories? Are we perhaps turned topsy-turvy by finding that his look at what the author values makes us sympathetic to one whose work we previously disliked or, conversely, does it make us dislike one whose work we previously accepted. Last month in this column I spent some time discussing the importance of the author's motives in understanding and judging his output (apropos of Sam Moskowitz's non-fiction work), so I find these writers' notes of particular interest, and the anthology as a

whole very timely. After all, any reader who finds a story in this collection which he had previously dismissed as being of little importance is bound to revise his thinking—maybe even his whole method of judging—when faced with the fact of its being the author's favorite.

But a note of warning is in order: authors being the individuals they are, there is great disagreement about the kind of process which brings forth the favorite story. To many it is the effortless one where words seem to spill forth without their volition. To others, the best work seems to come in painful and tortuous spurts, in an agonizing catharsis.

The list of authors reads like a *Who's Who* of S-F, headed by such notables as Blish, Collier, Bradbury, Heinlein, Knight, Sturgeon and Asimov. There are fifteen stories and an offbeat but appropriate epilogue by Alfred Bester. After I had gone through and picked two of MY favorites from this list of THEIR favorites, I realized that my two choices formed an interesting parallel. They are alike in many ways. One is Avram Davidson's "Now Let Us Sleep" and the other, Isaac Asimov's "The Ugly Little Boy." Both prevailingly sad, they each deal with creatures who have lost their value and the human being who makes himself re-

sponsible in each case. In Davidson's story the victims are the Yahoos, primitive inhabitants of Barnum's Planet, and the human who becomes involved is the man who tries to save them from extinction. In Asimov's, the characters are a Neanderthal boy and the woman who is hired to care for him after he is brought to the Present. I take considerable personal pleasure in the fact that Asimov picked this story for inclusion here. While I have great admiration for all his robust and other science-oriented stories, I have always cherished this particular story since I first read it, because it has a poignance which most of his others, for all their cleverness, lack. It reminds me, in this respect, of certain types of Clarke and Sturgeon stories, which have this quality without letting it run over the boundary into sentimentality. And speaking of Clarke, his omission from such a list of authors is inexcusable. Editor Mills should at least have explained why.

Three in One. Edited by Leo Margulies. 144 pp. Pyramid Books. Paper: 40¢.

This is a collection of three short novels, which had remained "uncollected" until the present volume, according to editor Margulies. He attributes this to the fact that it is of uncommercial

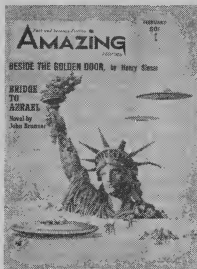
length. Though this is true, I can think of both hardcover and paperback anthologies that have often included short novels in books devoted to individual authors. And when I saw that the three writers to be included here were such stars as Theodore Sturgeon, Clifford D. Simak and Murray Leinster, I had doubts that any major contributions of theirs would have remained uncollected for so many years simply because the length was uncommercial. After all, these are three of the most commercially safe names in the business. After reading the three, I'm afraid my earlier doubts were justified to a large degree. You won't waste your time reading anything these authors wrote, but you probably won't carry much away with you from this representation.

Sturgeon's, *There Is No Defense*, touted as one of his few efforts in the realm of space adventure, the reason for this scarcity soon becomes apparent. Certainly on the basis of this novelet, it wouldn't seem to be either his favorite medium or the one in which he shows to best advantage. The scientific aspects seem vaguely sketched and the ending is both weak and to some extent unclear. The beginning is strong, however, as are all those parts which deal with the clash of ideas or personalities around the conference table.

Our solar system is menaced by an Invader from another part of space. The Invader, housed in a large space ship of unfamiliar design, strikes without rhyme or reason, and none of the planets are able to defend themselves. It proves impervious to all their armaments. So representatives of each world meet in the Joint Solar Military Council and finally decide to use The Death, our system's ultimate weapon and long outlawed since nothing survives it. What happens as a result of this decision is Sturgeon's story, which is interesting mainly because of who wrote it rather than because of what it accomplishes.

Simak's *Galactic Chest* is good but not vintage Simak. The whole plot is pretty thin (in fact, it's hardly a plot at all) and for the first time in my recent reading experience, Simak has stepped over the thin boundary that separates honest sentiment from sentimentality.

The story has one of his favorite characters and settings—a newspaperman (naturally) in a Midwestern town. This writer, named Mark Lathrop, has been stuck doing the Community Chest stories for the paper while all the time yearning to be one of the great fraternity—a foreign correspondent. How he achieves his heart's desire through the good offices of the brownies is



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Mr. Simak's story. These are the same brownies that people used to consider fairies. But in Mr. Simak's hands they are really creatures from space whose humans have mistaken for fairies in the past. Now, with all the benefits of publicity and the communications media, people can know them for what they are. What really sabotages Mr. Simak's good intentions, besides the somewhat mawkish tone I mentioned before, is the ambiguousness of the brownies. Mr. Simak has behind him a whole gallery of delightful aliens he has invented (or maybe even seen or experienced—who knows?). He has long had the knack of anthropomorphizing these creatures to such an extent that they become completely believable, lovable and three-dimensional. The extent of his failure to do so in *Galactic, Chest* can be measured by the fact that his brownies are the first of his creations that I don't care to kidnap for my own, and this in spite of their dogooding tendencies.

In *West Wind*,—by Murray Leinster, the plot of the novelet, like that of the Sturgeon story, revolves around a weapon for which there is no defense. However, in the case of the Leinster book, the death weapon is not a mystery weapon but radioactive dust which, due to the unchanging wind currents in a certain

layer of air, has helped a very small, weak nation to defeat a large, strong one that had invaded it. Since these winds always blow from west to east, from the small to the large country, there can neither be defense nor retaliation against the deadly dust once it is spread in the air at the proper place.

The story is really, to all intents, a one-character affair. It is told by Igor, a citizen of the smaller nation, who is infuriated at his country's giving up a province to the larger one without a fight. He feels that his President's warning to the enemy, that they mustn't come further than the agreed-upon province, is a bluff. So he stays behind when the province is evacuated in order to broadcast to his people about the enemy occupation and to try to instill in them a sense of shame for giving up without a fight.

Though an interesting story, and in many ways a good study in psychology, it misses the mark a little, mainly, I believe, because Igor is so many different things at so many different times. First, he is an angry patriot, then a prisoner, then really a weapon in himself, etc. Unfortunately the end product is that his essence is too vague to make him either a real person or a symbol.

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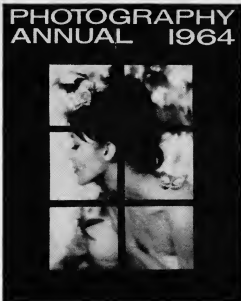
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